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Research Note

**ANALYSES OF SELECTED LHX MISSION FUNCTIONS** 

IMPLICATIONS FOR OPERATOR WORKLOAD AND SYSTEM
AUTOMATION GOALS

PREPARED FOR:
U.S. ARMY RESEARCH INSTITUTE
AVIATION RESEARCH AND DEVELOPMENT ACTIVITY
FORT RUCKER, ALABAMA

June 1984

Approved for guaranteering.

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PREPARED BY:



ANACAPA SCIENCES, INC. MILITARY PROGRAMS

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Human Factors Research in Aircrew Performance and Training MDA903 81-C-0504 ASI479-024-84

# ANALYSES OF SELECTED LHX MISSION FUNCTIONS

IMPLICATIONS FOR OPERATOR WORKLOAD AND SYSTEM AUTOMATION GOALS

'Prepared by:

Jack H. McCracken, Ph.D. U.S. Army Research Institute

and

Theodore B. Aldrich Anacapa Sciences, Inc.

June 1984



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BLOCK 20. ABSTRACT - Continued

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The analysis identified total workload for concurrent performance elements in four workload components: visual, auditory, cognitive, and psychomotor. An overload threshold was established so that overload conditions could be identified throughout the mission. Performance elements and subsystems associated with overload conditions were identified.

The analysis was conducted for three LHX configurations: (a) one crewmember, assuming existing crew station technology, (b) one crewmember, assuming a high degree of automated crew functions, and (c) two crewmembers, assuming existing crew station technology. Results included comparisons of overload conditions in the three LHX configurations.

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#### ACKNOWLEDGMENTS

Numerous individuals aided in the conduct of these analyses and the preparation of this report. Mr. Charles A. Gainer, Chief of the U.S. Army Research Institute's Field Unit at Fort Rucker provided guidance and supervision throughout the project. Mr. Richard Armstrong, Human Engineering Laboratory's Liaison Office at the Aviation Center, Fort Rucker, provided project coordination with the Tradeoff Analysis Group within the Directorate of Combat Developments. Mr. Harry Reed, Human Engineering Laboratory, Aberdeen Proving Ground, and Mr. Robert McMullen, Army Research Institute Field Unit, assisted in the analysis by identifying key performance elements in various LHX mission profiles. Subject matter experts CW3 Richard Hopkins, a highly experienced and current aeroscout pilot, and CW3 Frank White, an equally well qualified attack aviator, reviewed the analyses and contributed valuable insight into the scout and attack mission requirements.

The authors are also grateful to Ms. Remona Locklar, Army Research Institute, and Ms. Tina Pridgen and Ms. Nadine McCollim, Anacapa Sciences, Inc., for their extensive support in the formatting and typing of this report.

# ANALYSES OF SELECTED LHX MISSION FUNCTIONS: IMPLICATIONS FOR OPERATOR WORKLOAD AND SYSTEM AUTOMATION GOALS

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SECTION ONE: INITIAL ANALYSES, SINGLE CREWMEMBER, NO AUTOMATION

#### BACKGROUND

As part of its force modernization effort in aviation, the Army is evaluating the concept of a multipurpose, lightweight helicopter, the LHX. One of the major design goals for the LHX is that it should be capable of performing its various missions with a single crewmember. This design goal is desirable for two reasons. First, it will greatly increase the number of flight hours that can be flown with a given aircraft-to-pilot ratio. Second, design for single crewmember operation will result in a lightweight LHX with a smaller target profile. The small profile is particularly desirable in the scout-attack version. Design for single crewmember operation of the LHX may require considerable effort and expense to automate many system operations and mission functions. The purpose of these analyses is to provide baseline human performance data for evaluating various automation options and for assessing the feasibility of operating the LHX with a single crewmember.

The Army Research Institute (ARI) Field Unit at Fort Rucker was tasked, as the lead element, to develop analyses of LHX Scout-Attack (SCAT) missions in a message from Commander, Aviation Research and Development Command (AVRADCOM), dated 072325Z July 1983. As stated in the tasking document, the purposes of the analyses were (a) to evaluate the feasibility of single pilot LHX mission performance, and (b) to help identify the equipment, operation, and mission functions where automation would be most beneficial. The analyses were envisioned as useful in defining LHX aircrew selection and training requirements.

#### TECHNICAL OBJECTIVES

In accordance with the tasking message, the initial analyses were designed to achieve the following technical objectives:

- provide an objective method for evaluating the feasibility of single pilot operation of the LHX during Scout-Attack missions, and
- provide analytical material for identifying equipment operation and mission functions where automation can reduce pilot workload and enhance mission performance.

Because of severe time limitations, the methodology adopted for the initial analysis was designed to provide

approximate, first-iteration results at the function level. In developing the methodology, certain procedural limitations were necessary. These limitations are listed below.

- Subsystems, and procedures for their operation, were viewed in non-specific, generic terms.
- The level of analysis was limited to identification of general performance elements within functions.
- Analyses addressed only primary aeroscout and attack mission functions under normal operating conditions.
   Degradation resulting from system failures, visual obscuration, or enemy countermeasures were not addressed.
- No validation was possible except for content review by subject matter experts.
- As a baseline case, the general level of subsystem and weapon technologies for the LHX were assumed to be comparable to those provided in the OH-58D and AH-64A.
- Time estimates, cognition requirements, and other parameters of mission functions were based upon the analysts' understanding of current Army doctrine and tactics.
- The LHX mission analyses prepared in this study will become a baseline for follow-on efforts comparing alternative combinations of man/equipment capabilities.
- These analyses will be subject to change and further refinement as equipment configuration becomes known.
- A standard vocabulary of verbs and objects was established and applied in these analyses. The vocabulary is provided in Appendix A.

Within the above limitations and assumptions, the analytical methodology was organized into the four tasks described in the following paragraphs.

Identification of Mission Phases and Segments

Phases are defined as the major units by which all missions can be characterized (e.g., enroute, reconnaissance, target servicing, etc.). Segments are analytically convenient groupings of related activities which take place within

a phase (e.g., the target servicing phase may include segments such as target acquisition, handoff, and/or direct engagement). The phases and segments for these analyses were developed through examination of 24 LHX (SCAT) profiles prepared by DCD at the U.S. Army Aviation Center (USAAVNC). Based on an examination of these profiles, the matrix shown in Table 1 was developed. The matrix shows the 12 major SCAT missions envisioned for the LHX. The "X"s were placed in the columns to signify the segments judged to be prominent within each mission. The cells with an X in parentheses were selected for analyses of functions.

#### Identification of Functions Within Segments

Cnce mission segments were identified, it was possible to analyze their execution in terms of essential or critical functions. Since explication of workload and operational effectiveness variables were guiding considerations in the analysis, it was necessary to identify those functions that must occur within a segment, and also to estimate when they occur in relation to one another. Excessive operator workload (and performance degradation) may result from either (a) inordinate time pressure among segmential functions, or (b) when two or more functions, each having high workload demands, must be performed concurrently. Worksheets were developed to depict both concurrent and sequential functions. It was reasoned that concurrent or overlapping performance is most likely to be required among functions belonging to different categories, as listed below.

- •Flight Control those functions which are directly involved in flying aircraft,
- Support functions which support both flight control and mission functions, but are not directly involved in either; examples include checking systems and threat warning displays, navigation, radio management etc.
- Mission functions directly involved in performing mission objectives; examples include target acquisition, engagement, etc.

Accordingly, segment summary sheets were developed which provide separate columns for categorizing each function. An example of a summary sheet showing functions involved in an air-to-air engagement is presented in Table 2.

Table 1 SCAT Mission Phases, and Segments

		T	T	T	Т	T -	1	1	1	T	T	T	Т
	TERMINAL	×	×	×	×	×	×.	×	×	⊗	×	×	>
	аяч з	×	1.0	×	×		×		×			<u> </u>	
	TACT, MOVEMENT	×	£	×	×	×	×	×	×	×	×	£	1 5
	TEAM COORD:	×	×	×	×	×	×	×	(X)	×	×	(X)	5
	TNEMTSULGA		(X)	×	×	×		×	(x)		×		
	НУИООЕЕ				×	×		×	(x)		×	(x)	8
VTS	ЕИСАСЕМЕЙТ	(X)	(x)	×		×	×	×	(X)	×	×	(x)	8
SEGMENTS	АСQUÍSITІОЙ	×	(x)	×	×	×	×	×	83	×	×	(X	8
	TARGET SERVICE							1		ľ			
S AND	тяоазя			,	×	×	×	×	×	1	ŝ	×	×
PHASES	SURVEY				×	×	×				(X)	×	×
	TACT, MOVEMENT	(X)		·	æ	×	×	×	×		æ	×	×
MISSION	EST. OPS.				×	×		,	×		(X)	×	×
MI	<b>KECONNAISSANCE</b>			1									1
	иое	х	X	×	х	×	(X)	×	×	×	×	×	×
	СОИТОИЯ	X	Х	×	×	×	(x)	Х	×	×	×	×	×
	TOM FEAET									(X)		,	
	этоояиз		·			-			,	-			
	<b>БРАКТ</b> И <b>КЕ</b>	×	×	×	×	×	×	×	×	×	×	×	×
	PREFLIGHT	×	×	×	×	×	×	×	×	×	×	×	×
	SCAT MISSIONS	ANTI-ARMOR	ANȚI-PERSONNEL/MATERIEL	SPECIAL OPS STRIKE	RECONNAISSANCE	SECURITY	DEEP STRIKE	RACO	SEAD	AMPHIBIOUS ASSAULT	FAAO	AIR-TO-AIR (DEFENSIVE)	AIR-TO-AIR (OFFENSIVE)

Table 2
Segment Summary Worksheet

Phase Target Se	rvice. Air-to-Air	
Segment 25: Engagemen	<u>t Air-to-Air</u> Meth	od From Masked Position
FLIGHT CONTROL	SUPPORT	MISSION
Hover Masked	Check A/C Systems	
Unmask Sensor	ı ,	
	1	Track Target
Align Heading on Target Bearing	<b>'</b>	
	,	Estimate Range
,		Prepare Weapon
Unmask Aircraft		
		Track Target
		Fire Weapon
Deploy to Cover		

Two rules were adhered to in preparation of segment summary sheets. First, functions were included in segments only if they were considered critical for accomplishing the specified mission activity or if they must be performed on a recurring basis, independent of mission activity (e.g., check aircraft systems). Second, to the extent possible, initiation times of functions were staggered to reflect logical sequencing and to avoid unnecessary overlapping of performance elements. In preparing these summary sheets, every reasonable effort was made to conform to accepted aeroscout and attack mission doctrine. ATMs, field manuals, and existing task analyses were used as references. Additionally, all summary sheets were revised to incorporate recommendations from aeroscout and attack subject matter experts (SMEs).

Summary sheets were initially prepared for all 31 segments in Table 1 shown with an X in parentheses. Subsequently, alternative performance methods were included for some segments, thus increasing the number to more than 40. Several segment summaries contained virtually identical performance procedures. Eliminating such duplicates reduced the number of summary sheets to 29. Summary sheets retained for further analyses are shown in Appendix B.

#### Analyses of Functions

The completed segment summaries were used to identify functions for further analyses. The 29 summaries contain 58 functions, including alternative methods. These 58 functions were analyzed in terms of their respective performance elements, workload, and time variables. A sample of a completed worksheet used in conducting the analyses is shown in Table 3.

Each performance element within a function was listed in a format containing a verb and an object. Listed performance elements were limited to those considered critical to successful performance of the function. For purposes of analysis, it was assumed that all listed performance elements are to be performed by a crewmember.

Each performance element was analyzed in terms of subsystem, workload demand, and duration. Subsystems associated with the performance elements were straightforward and evident. The subsystems listed are those <u>primarily</u> involved in each performance element and are intended to be generic. Workload is composed of three variables:

- sensory: complexity of visual or auditory stimuli requiring response,
  - · cognitive: level of thinking required, and
  - psychomotor: the complexity of behavioral outputs required.

Workload in these analyses is not limited to <u>overt</u> behavior. A considerable portion of aviators' efforts, especially in combat missions, is occupied in sensory intake and processing. The variables listed above seem well suited to account for these subtle but important demands on pilots' resources.

The scales in Table 4 were used to quantify these variables for each performance element listed in the functions.

Table 3

Function Analysis

Total Time (Approximate)\_\_

Function Detect Target (Ground)

Method

					10	· · · · · · · · · · · · · · · · · · ·
		COMMENTS	s + 13 -	13 - 15	15.5 - 20.5	
	DURATION (SECS)	DISCRETE/ CONTINUOUS	12.5		ις	
	DURA (SE			4		
	WORKLOAD COMPONENTS	PSYCHOMOTOR	Control pressure (LOS) (P-4)		Control pressure (P-4)	
		COGNITIVE	Area clear? Control pressure (LOS) (LOS) (P-4)	Signal (movement) (C-2)	Target centered (C-2)	
		SENSORY	Visual survey (V-1)	Visual detection (V-2)	Visual alignment (V-4)	
		SUBSYSTEM(S)	Sensor display Visual scene survey AS (V-1)	Sensor display Visual scene detect	Sensor display/sight ADS	
	E ELEMENTS	OBJECT	147 Search Target area	:	Sight	
	PERFORMANCE	VERB	147 Search	75 Detect Movement	24 Align	

Table 4
Workload Components

SCALE VALUE	DESCRIPTORS
1 2 3 4 5 6 7	VISUAL  Monitor, Scan, Survey Detect Movement, Change in Size, Brightness Trace, Follow, Track Align, Aim, Orient On Discriminate Symbols, Numbers, Words Discriminate Based on Multiple Aspects Read, Decipher Text, Decode
1 2 3 4	AUDITORY  Detect Occurrence of Sound, Tone, Etc.  Detect Change in Amplitude, Pulse Rate, Pitch  Comprehend Semantic Content of Message  Discriminate Sounds on the Basis of Signal Pattern  Pitch, Pulse Rate, Amplitude
1 2 3 4 5 6	COGNITIVE Automatic (Stimulus-Response) Sign/Signal Recognition Alternative Selection Encoding/Decoding, Recall Formulation of Plans (Projecting Action Sequence, Etc.) Evaluation (Consider Several Aspects in Reaching Judgment) Estimation, Calculation, Conversion
1 2 3 4 5 6 7	PSYCHOMOTOR  Discrete Actuation (Button, Toggle, Trigger)  Discrete Adjustive (Variable Dial, Etc.)  Speech Using Prescribed Format  Continuous Adjustive (Flight Controls, Sensor Control, Etc.)  Manipulative (Handling Objects, Maps, Etc.)  Symbolic Production (Writing)  Serial Discrete Manipulation (Keyboard Entries)

Scale values contained in Table 4 were applied to the function analyses after all performance elements had been identified and listed with verbal descriptors. The verbal description for each workload variable was matched with one of the categories contained in the coding charts. The number rank corresponding to the category was then assigned to the variable.

Inferences about workload demand requirements from the numbers presented in the function analyses should be in relation to the verbal anchors corresponding to the numbers in Table 4. To the extent that interpretations of numerical ratings are tied to the verbal anchors, there is a rational basis for judging the relative demands posed by performance elements. However, it should be remembered that these numbers, and the performance elements to which they are applied, represent only the best estimate of the analysis team. As such, they should be used as points of departure for further refinement or validation.

Another step in the function analyses was estimating time intervals for all performance elements. Performance element times cannot be precisely determined in advance of hardware/equipment design. Nevertheless, the time dimension was considered an essential component of the workload posed by each performance element. Therefore, the duration of each performance element was estimated and included in the analysis.

Each performance element was categorized as discrete or continuous. Discrete performance elements are characterized by actions having a definite, observable start and end point. Activation of switches, performance of procedural steps, and radio transmissions are examples of performance elements considered discrete. Continuous performance elements do not have observable start and end points. They cannot be reduced to procedures. Cyclic, collective, and pedal movements for controlling the helicopter, and tracking tasks associated with airborne sensors are examples of continuous performance elements.

The following helicopter task analyses were used as references:

- OH-58D MEP Description and Workload Analysis. Bell Helicopter Report No. 406-099-063 (Taylor, R. R., & Poole, R., 1983).
- Time Series Analysis for the AHIP. Applied Psychological Services, 1982.

- Time Series Analysis for the AH-64. Applied Psychological Services, 1982.
- Analysis of Control and Coordination During Helicopter Anti-Armor Operations. The Mitre Corporation Report No. MTR-82W00022 (Holt, C. R., & Kelbawi, F. S., 1982).

The analysts sought tasks in the reference material similar in content and mission context to the performance elements identified in these analyses. Task times published in the references were used in making the estimates of duration for the LHX performance elements.

Computation of the estimates for total function times are presented in the Comments column. The following decision rules were established for estimating total time.

- All performance element time estimates were rounded off to the half second.
- A transition time of .5 second was inserted before each performance element unless it is likely that an aviator would be in a performance mode not requiring transition to the next performance element.
- Time estimates for discrete performance elements were summed.
- · Transition times were added to the sum.
- Time estimates for continuous functions judged to overlap other performance elements were not added to the sum. In these cases, the time estimates were adjusted to compensate for some degree of overlap.

Some functions require continuous performance elements having an indeterminate duration. Mission requirements are the determining factors prescribing their duration. Performance elements such as "monitor surroundings" and "survey approaches to AO" are examples. An arbitrary duration time was assigned to such performance elements for these initial analyses.

Readers are cautioned that the times in these analyses are only estimates and represent a consensus of the analysts involved in this work. The time estimates were judged to be reasonable by reviewers who are highly experienced and current in attack and scout missions, but they have not been validated. The analyses require refinement through several iterations as the conceptual and subsequent design and development phases of the LHX ensue. True validation for the

estimated times and other elements in the analyses must await further system definition.

The complete set of 58 Function Analysis Summaries are contained in Appendix C.

Summary of Concurrent and Sequential Workload Demands

The primary objective of these analyses has been to provide a data base for evaluating the single versus dual crewmember requirement and various automation options. As pointed out earlier, excessive demands on pilots' resources may be caused either by time pressure among sequential performance elements or by competing demands from performance elements which must be performed concurrently. Particular consideration should be given to the compounding of workload requirements which result when performance elements must be performed concurrently. Worksheets for tabulating the three major sources of demand were developed in order to identify concurrent demands placed on the operators' resources. A completed worksheet is presented in Table 5. A complete set of summary charts is found in Appendix D.

The worksheet consists of four main sections, three corresponding to the major function categories of (a) flight control, (b) support, and (c) mission, as discussed, and one section for summing workload demands across columns. Each category is further divided into a column for identifying the function and four small columns headed by the letters V (visual), A (auditory), C (cognitive), and P (psychomotor). Vertically, the chart is a cumulative timeline with 10-second increments.

Within the function column, each function is identified by a two-digit number. The identification number corresponds to the function identification numbers listed in the Table of Contents for Appendix D. For additional convenience, the listing of functions, including identification numbers, is also included in Appendix C.

The workload demand estimates in columns V, A, C, and P were derived from the function analyses contained in Appendix D. The numbers in each block represent the <u>peak</u> demand for the workload mode during the 10-second interval for that function. By summarizing workload demand for each 10-second interval, it is possible to develop a running account of these variables throughout each segment. Total demand placed on the operation for each modality (VACP) during each 10-second interval is estimated by summing across

corresponding entries to arrive at the totals in the right-hand columns.

Table 5

Summary of Concurrent and Sequential Workload Demands--Single Crewmember

Phase	-	Target	Service.	Air-to-Air				
Segment	24:	Acquisi	tion	<del></del>	Method_	Free	Search	

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	F	LIG	ዘፕ			50	SUPPORT					MISSION						TOTAL CONCURRENT			
CUM. SECS.	Function	·V	А	С	. P	Function V A C P Fu			Function	v	А	С	P	V	A	С	P				
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40		2		2	4						32	1		3	4	3		5	8		
50		2		2	4							4		4	4	6		6	8		
60		2		2	4						15	4		6	4	6		8	8		
70		2		2	4							2		4		4		6	4		
. 80		2		2	4	49	5	1	4	3						7	1	6,	7		
. 90		2		2	4						27 '	3		3	4	5		5	8		
100		2		2	4							4		5	4	6		7	8		
110		2.		2	4	20	4		1	4		,				9		6	12		
120		2		2	4		6		6	4					•	11		11	12		
130		2		2	4			·	7							2		9	4		
140						1									,						
150									_						٠						
160							,							_							
170																					
180																					

As mentioned in the preceding section, the numbers representing workload demand are best interpreted in relation to the verbal anchors shown in Table 4. It is not possible, given the generality of analyses presented here, to develop any hard and fast rules for specifying the level where an operator's capacity is exceeded. However, Level 7 was judged to be the upper boundary of human workload capacity in any single mode.

Prudent use of the workload demand summaries can be helpful, but must be considered tentative indications of where a single operator's workload capacity may be exceeded. They provide a point of departure for assessing probable workload with varying mixes and degrees of subsystem automation. Tentative identification of operator overloading, and judgments about the probable effects of automation options are the most appropriate applications of the results of these analyses.

SECTION TWO: ANALYSES REVISED FOR ONE CREWMEMBER,
HIGH DEGREE OF AUTOMATION, AND
TWO CREWMEMBERS, NO AUTOMATION

The base case, nonautomated, single crewmember analyses reported in Section One assumed equipment configuration roughly equivalent to the AHIP Scout or the AH-64A. The results of the basic analyses are presented in Appendix C, Function Analysis Worksheets, and Appendix D, Summaries of Concurrent and Sequential Workload Demands. Every one of the 29 segments summarized in Appendix D contains several instances of overloading operator capacity. Thus, the results from the initial analyses strongly indicate that single pilot operations in the LHX will require considerable automation of crew functions. An iteration of the basic analyses assuming a high degree of automation was selected as the next analytical requirement.

Costs of automation may be unacceptable. An alternative means of reducing single pilot workload is to design LHX with a dual crewmember configuration. In fact, the Army plans to conduct tradeoff studies to determine whether one or two crewmembers are required. An iteration of the basic analyses assuming two crewmembers was selected as another analytical requirement.

This section reports the results obtained from two iterations of the basic analyses described above. The first iteration revised the initial analyses by incorporating a high degree of system automation for a single crewmember. The second iteration revised the initial analyses by distributing the Section One crew functions and performance elements to two crewmembers.

## FIRST ITERATION: ONE CREWMEMBER, AUTOMATION

Several assumptions about LHX subsystem automation were stated prior to conducting this iteration. They are listed below.

# Flight Control Automation

- Hover hold with altitude, heading, and drift override (gradual) switches.
- Interface with Fire Control Computer (FCC). Heading control can be slaved to the target sight reticle while tracking. Pitch should not be under FCC control

since the interface may cause unacceptable aircraft control problems, especially in hover flight.

 Automatic cruise modes for low level and contour flight with an interface with the navigation and preloaded mission data system.

#### Weapon Systems

- Automatic weapon selection, fusing, laser code selection, verification of firing conditions, and weapon release to achieve maximum hit probabilities.
- Weapons launcher variable elevation control slaved to the FCC (Lock-on After Launch, Folding Fin Aerial Rockets) or to target sight reticle (Lock-on Before Launch, or infrared heat seeking munitions).

### Target Acquisition

Stepwise semi-automatic target acquisition system with pilot-selected modes as follows.

- Automatic search/detection within a pattern selected by pilot. Pattern selection based on simple indications of quadrant(s) and range of interest for search. Automatic cueing of "targets" having predetermined characteristics.
- Automatic recognition/classification of targets. When activated, a device scans target features to classify and assign priorities to each target on the basis of predetermined aspects. Classification symbols and numbers are automatically presented on the pilot's sight display.
- Automatic target position determination. Targets are identified using cueing numbers and a single switch is activated to obtain position data. Each target selected is automatically lased in rapid succession and all position data are entered into the mission computer for storage, handoff, or direct engagement.

## Voice Interactive Data Processing

Simple voice commands or data inputs are converted to digital form for processing or transmission. It is assumed that voice commands or dictation of data will supplant use of

the data entry keyboard to the maximum extent possible. Voice interactive data processing will be capable of feeding any of the mission computer functions (e.g., target handoff, fire control, navigation, data storage, target acquisition, etc.) selected by the pilot.

#### Navigation System

An automatic navigation system complete with automatic updating. A map display, depicting aircraft position, along with course and distance to any selected waypoint(s) will be continually updated to maintain aircraft position centered on the display. Other information that can be presented at pilot discretion will include all last known threat/target locations, wind direction and velocity, fuel remaining, maximum range and endurance airspeeds, and estimated time enroute to selected waypoints at selected airspeeds.

# Fault Detection and Threat Warning

- System fault and threat signals are automatically diagnosed and verified, with invalid signals being disregarded.
- Appropriate countermeasures such as fault isolation, electronic countermeasures, jamming, etc., are initiated automatically for valid fault or threat signals.
- Appropriate visual and aural signals, along with indications of procedures initiated, are presented to the pilot.
- All threat signal source locations are automatically stored and can be called up as vectors on the navigation display at the pilot's discretion.

All function analyses (Appendix C) in the initial analyses were reviewed and revised as appropriate to allow for the automation assumptions listed above. The function analyses in Appendix F resulted from the review and revision. Revised function analyses are indicated by the word (Revised) entered on the method line. New tables summarizing operator workload demands were developed and are printed in Appendix F. These workload demand tables summarize the effect of automation in reducing operator overload. Table 6 further summarizes comparisons for various flight regimes and for various subsystem areas. The diagonal line in each cell separates the instances of excessive workload demand reported

Table 6

Summary of High Workload Demand Incidents - Flight Regimes Vs LHX Subsystem Areas - Single Pilot Base Case/Single Pilot With Automation

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	WEAPON PANEL 6 CONTROLS		~	*					
	DEK					~ ~ ~	22.0	2 - 2	2 9 65
	THREAT	T		1	1 - 1				, , , , ,
	OUTSIDE VISUAL, MAP, & MAP DISPLAY		44			2 2	10 20	-	21 29
	NAVIGATION DISPLAYS 6 CONTFOLS				5 3 4				2 2 7
	RADIO			1 - 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		2 2		1010
	SENSOR		,	2 1 2	1 2 2		5 19 88		23 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	SENSOR DISPLAYS			5 52	3 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		10 27	9 - 6	28 23 23 23 2
	ENGINE & CAUTION DISPLAYS				1				
	- FLIGHT CONTROLS		2 - 2	2 2 2	·		13 .108	14 65	35 8 159
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		MAIHTAIN SEPARATION	ESTABLISH DASH/ATTACK	CONTROL/ ADJUST HEADING	MANEUVER NOE	MASK; REDUCE ALTITUDE; STABILIZE A/C	UNMASK; INCREASE ALTITUDE; STABILIZE A/C	HOVER MASKED A/C	TOTAL

V = Visual; C = Cognitive; P = Paychomotor

in the basic analyses, Appendix D, from the instances of excessive workload demand reported in the first iteration of the analyses, Appendix F. The number of instances to the left and above the diagonal are for the single crewmember, no automation analyses, and the number of instances to the right and below the diagonal are for the single crewmember with extensive automation as assumed above.

The consequences of assuming automation to the extent described above are significant. Under these assumptions, the likely occurrence of excessive workload demands are reduced to brief periods in only three segments--Evade Radar Lock-on, Tactical Movement, and Team Coordination. Each of these instances of excessive workload demand occur during nap-of-the-earth (NOE) flight, when considerable attention is required for maneuvering the aircraft along an NOE course. In this flight regime, the pilot's visual and cognitive resources are excessively taxed by attending to the sensor in order to survey airspace and/or surrounding terrain. of the three instances of overload result from this combination of functions. These overload situations can be avoided operationally by the tactical expediency of separating survey or overwatch functions from maneuver functions. Using teamwork, a pair of aircraft can maneuver along a course, alternating movement and overwatch functions in a bounding overwatch. This team maneuver technique will be more important in operations with LHX aircraft flown by single crewmembers than with two crewmember aircraft.

The other instance of excessive workload demand occurs when the pilot must respond to a threat warning signal (evade threat radar) during NOE maneuvering. The cognitive and visual workload components required to respond to a threat radar lock-on signal, combined with the demands required during NOE maneuvering, will be excessive for a few seconds until an evasive maneuver has been initiated. It is doubtful that overloading the operator, at least temporarily, can be avoided in this instance.

Single pilot LHX mission performance appears feasible if automation is provided to the extent described in the assumptions. However, there are several critical questions that need to be addressed.

- What system reliability can be attained in the automated systems?
- What mission performance can be expected in conditions degraded by threat countermeasures, weather, or battlefield obscuration?

 How cost-effective will the automated systems be in comparison to a dual configuration LHX with less automation?

These issues are beyond the scope of these analyses. They should be the subjects of continuing analytical and simulator work.

SECOND ITERATION: TWO CREWMEMBERS, NO AUTOMATION

As a second iteration, the baseline analyses were reviewed to reflect how workload would be reduced by distributing crew functions among two pilots. The first step was to assign flight control functions to one crewmember and support and mission functions to a second crewmember. Assumptions about system configurations underlying the original mission analyses were retained for this iteration. No automation options were included. Equipment and system configurations roughly equivalent to the current AHIP Scout or the AH-64A remained a basic assumption.

The function analyses (Appendix C) completed in the first iteration were reviewed and divided into three groups. Twelve function analyses involving flight control performance elements were assigned to one group. Forty function analyses involving support and mission functions were assigned to a second group. Thus, 52 of the function analyses were neatly divided into flight control functions and assigned to one crewmember and support and mission functions assigned to a second crewmember. The third group consisted of six function analyses judged to have performance elements likely to be performed by both crewmembers.

The 58 function analyses are shown in Appendix G. The 12 function analyses in the flight control group are annotated "Pilot" on the Method line. The 40 function analyses in the support and mission group are annotated "Copilot" on the Method line. The six function analyses judged to have performance elements likely to be performed by both crewmembers are annotated "Both" on the Method line. The performance elements in these six function analyses have been further annotated to include whether the performance element is likely to be performed by the pilot or a copilot or would routinely be performed by both.

The tables summarizing operator workload demand (Appendix D) were revised to depict the reduced workload demands as a result of distributing the crew functions are are located in Appendix H. The summary table format was revised to depict the workload demand placed on each

crewmember by dividing the cells with diagonal lines. Numbers above and to the left of the diagonal line represent workload demands on the pilot and numbers to the right and below the diagonal line represent workload demands on the other crewmember. The timeline and basic organization of the summary table were retained to enable direct comparison between the one crewmember analyses and the two crewmember iteration.

Table 7 compares the results for single vs. dual crew for various flight regimes and for various subsistem areas. The diagonal line in each cell separates the instances of workload demand reported in the basic analyses, Appendix D, from the second iteration of the analyses reported in Appendix H. The number of instances to the left of the diagonal are for the single crewmember, no automation, and the number of instances to the right of the diagonal are for two crewmembers, no automation.

The most dramatic result from this iteration was the decrease in workload demand during flight control functions. One hundred and ninety-three instances of excessive workload demands were reduced to four. Reduced workload demands also occurred in the support and mission functions.

- Fifty-four instances of excessive workload demand during functions involving use of sensor displays were reduced to twenty-nine.
- One hundred and twenty-seven instances of excessive workload demand during functions involving use of sensor controls were reduced to ninety-four.
- Ten instances of excessive workload demand during functions involving use of radios were reduced to five.
- Thirty-nine instances of excessive workload demands involving comparison of the outside visual field with a map or map display were reduced to nine.
- Sixty instances of excessive workload demand involving use of a digital entry keyboard were reduced to three.

Excessive workload demands were eliminated completely from only seven of the 29 mission segments in the base-case analyses. The seven are:

- Transmit report;
- Engagement, Point Target (Remote Designation);
- Engagement, Soft Target (Cannon Fire, Hover);

Table 7

Summary of High Workload Demand Incidents - Flight Regimes Vs LHX Subsystem Areas - Single Pilot Base Case/Two Pilots (No Automation)

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THREAT		1 - 1	·	1 - 1	1	,		
OUTSIDE VISUAL, MAP, & MAP DISPLAY		~ ~ ~	·	,	2 2	10 20	E 0 E	212 23
NAVIGATION DISPLAYS & CONTROLS		,	1 - 1	2 2 1		1		2 4 1 10 4 5 5 1 10 4 5 5 1 10 10 10 10 10 10 10 10 10 10 10 10 1
RADIO			1: 11 1	1 1 1		3 1 2 3 2		10 2 3
SENSOR			7	1 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		110 19 . 12 8\$ 86 73		23 15 23 15 95 94 73
SENSOR			5 5	1 1 1	,	10. 27 17. 13	11 - 3	28 34 34 3 34 3 34 3 34 4
ENGINE CCAUTION DISPLAYS	1	•		1 1				
FLIGHT	- 2	2 2	\$ 16	~ .	,	13 108 -	14 65 - - 51 3 -	35 193 8 - 159 4 1
	> U &	بە ن خ	> U &	> U A	·> U a	> U A	> U &s	> U &
	MAINTAIN SEPARATION	ESTABLISH DASH/ATTACK	CONTROL/ ADJUST HEADING	MANEUVER NOE	MASK; REDUCE ALTITUDE; STABILIZE A/C	UNMASK; INCREASE ALTITUDE; STABILIZE A/C	HOVER MASKED A/C	TOTAL

V = Visual; C = Cognitive; P = Paychomotor

- Engagement, Soft Target (FFAR Direct);
- Receive Handoff (Voice);
- Engagement, Air-to-Air (Running Fire, Cannon);
- Engagement, Air-to-Air (Running Fire, Missile).

Excessive workload demands remain in the other 22 mission segments. The crewmember performing support and mission functions is frequently overloaded while using sensor displays and controls in the hover masked and unmasked flight regimes.

Two limitations of this second iteration need to be stated. First, the separation of crew functions between the two crewmembers was maintained throughout the iteration. This is different from the real operational world where a second crewmember sometimes can provide assistance during peak workload demand periods. This iteration does not allow for flexibility provided when two crewmembers can share functions. Second, no automation is assumed. Automation of sensor functions would significantly reduce the considerable workload demands that remain after distributing mission functions between two crewmembers. This iteration leads to the conclusion that some automation will be required if the two crewmember LHX configuration is selected.

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A P P E N D I X A
GLOSSARY OF TERMS

#### APPENDIX A

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#### I. VERB LIST AND DEFINITIONS

ACCELERATE

- Increase speed.

ACKNOWLEDGE

 Indicate that instructions have been received and understood.

ACOUIRE

- To gain completely; to capture.

ACTIVATE

- To make active; to put in active status.

**ADDRESS** 

- To direct a report to the intended receiver.

ADJUST

- To change or correct so as to fit; conform; make suitable; make accurate.

ALIGN

- To bring into a straight line.

**APPROACH** 

- To come closer or nearer. To fly a specified flight path bringing the aircraft nearer to a landing area, target area, rendezvous area, etc.

ARM

- To make ready the parts needed for operation.

**ASSESS** 

- To estimate or determine the significance, importance, or value of; to evaluate.

BRIEF

- To supply with all the pertinent instructions or information.

CHANGE

- To substitute; to make different; to replace with or transfer to another of a similar kind.

CHECK

 Examine to determine if something is as it should be.

CLEAR

- To pass without contact; to visually check that path is free of obstacles; to open up or free up a display.

CLIMB

- Increase altitude.

COMMUNICATE (COMM)

- Transmit and receive information by radio or visual signals.

COMPLETE

- Bring to a conclusion; end; finish. To make whole, full, or perfect.

CONTROL

- To regulate in a prescribed manner or within safe or prescribed limits, especially in regards to movement.

COPY

- To transcribe an aural message to a written memo.

COORDINATE

- Adjust so as to have harmonious action.

CORRECT

- To make right; change from wrong to right; remove errors from. To make an adjustment so as to compensate for an error or a counteracting force.

DE-ARM

- To make safe.

DEPART

- To fly away from an area.

DEPLOY

 To fly a mission in accordance with a specified plan.

DESCEND

- Decrease altitude.

DESIGNATE

- To point out; mark out; indicate or specify.

DETECT

- To discover or find a target.

DETERMINE

- To reach a decision about something after thought and investigation; decide upon. To find out exactly; calculate precisely; ascertain. To decide or resolve.

DICTATE

- To speak aloud into a recorder.

DIRECT -

- To manage the action of; guide; conduct, regulate. To order or command with authority. To turn or point toward an object or goal; aim; head. To tell a person the way to a place. To plan the actions and effects of. To supervise and instruct in the carrying out of a plan.

DISCONNECT

 To break or undo the connection of; separate; detach; unplug.

ENTER

- To put into; insert.

**ESTABLISH** 

. To set up or make stable.

**ESTIMATE** 

- To judge or determine generally but carefully; calculate approximately.

**EVADE** 

- To escape from surveillance.

**EVALUATE** 

- To judge or determine the quality of; to appraise.

FIRE

- To discharge a weapon

FOLLOW

- To direct ones course to approximate the course taken by a leading element or designated route.

FLY

- To traverse a course supported only by movement through the air, out of ground effect.

HANDOFF

- To transfer target information from a scout to an attack aircraft or one attack aircraft to another attack aircraft; to transfer an aircraft from one controlling agency to another.

HOLD

- To maintain a steady state or condition.

HOVER

- To maintain a position in the air near one place.

IDENTIFY

 Given a stimulus occurrence, the act of classifying it as belonging to a set of general or specific occurrences having key elements in common.

**INCREASE** 

- To raise the amount of a variable state (i.e., size, amount, intensity, number).

JOIN UP

- To come into proximity with other elements of a team, such as aircraft in formation.

LIST

- To enter a series of words, names, or numbers, designating essential flight or mission information, into a catalog, directory, or roll.

LOCK-ON

- To track and automatically follow a target, as by radar or other sensor.

MAINTAIN

- To keep in a certain condition or position of flight.

MANEUVER

 To change the movement of a flying aircraft according to a specific pattern or series of movements.

MASK

- To fly to a position where the aircraft will be concealed from observation.

MONITOR

- To casually attend to a source (i.e., display) of possible sensory events or changes.

NOTE

- To pay close attention to.

**OBSERVE** 

- To actively and purposely attend to or witness an event or series of events for the purpose of learning, data collection, etc.

OVERFLY

- To fly an aircraft over a specified area or position for reconnaissance or to update navigation systems.

**PERFORM** 

- To do.

POSITION

- To place oneself or others in a location or posture.

**PREPARE** 

- To set in order; to make ready.

PROVIDE

- To furnish or supply.

RECEIVE

- To acquire or get; to get knowledge or information about.

RECOGNIZE

 Upon being presented with a sensory event or object, to identify it by past experience or on the basis of descriptions.

RECORD

- To place data or stimulus events into a form for later access or recall.

REDUCE

- To lower or bring down

REGAIN

- To get back one's possession; to succeed in reaching again; to recover.

RELEASE

- To let go, loosen completely.

REPLAY.

- To play again, usually for the sake of review.

RESPOND

- To answer, reply; to act in return.

REVIEW/EDIT

- To listen to a recorded report and revise for accuracy prior to transmission.

**SEARCH** 

- To look over for the purpose of finding something.

SELECT

- To choose from among two or more options,

SEND

- To transmit, as by radio or other communications medium.

SLEW

- (Also slue.) To rotate around a pivotal point (e.g., slew the gun turret, etc.).

SLOW

- To reduce speed.

STABILIZE

 To stop all fluctuations from a desired dynamic condition, such as altitude, airspeed, heading, etc. STORE

- To put or keep for later recall and use, as in a computer memory unit.

STOW

- To place something in an appropriate place and condition when not in use.

SURVEY

 To collect information of a predetermined type on the basis of first-hand observation and measurement, or by questioning a number of authoritative sources.

TRACK

- To observe or plot the path or trajectory of and record data from using a sensor, such as radar; to follow as with a sight.

TRANSLATE

- To convert information from one form into another (usually across languages). Prefer use of "convert" in referring to changing from one metric system to another.

TRANSMIT

To send out communications through electromagnetic energy.

UPDATE

- To provide current information on a set of changing conditions.

UNMASK

 To fly to a position where the sensors or aircrew can observe a target, enemy position or to where the aircraft is no longer concealed from observation.

VERIFY

- To confirm a tentative conclusion by using a second opinion or by using a test to resolve any doubt.

### II. OBJECT LIST AND DEFINITIONS

A TO A	<ul> <li>Air to air. The maneuvers and weapon firing (gunnery) employed when aircraft attempt to engage and destroy other aircraft in flight.</li> </ul>
A TO G	<ul> <li>Air to ground. The maneuvers and weapon delivery operations employed when aircraft attempt to engage and destroy targets located on the ground. Definition limited to tactical operations.</li> </ul>
ACCESS	<ul> <li>An unobstructed way or means of approaching or viewing a destination.</li> </ul>
ACKNOWLEDGMENT	<ul> <li>A response indicating receipt and understanding of a communication.</li> </ul>
ADF	- Automatic Directional Finding. A feature of low frequency radio equipment that indicates the direction to the transmitting radio source.
AIRCRAFT (A/C)	- Airplanes, helicopters, etc. Applies to all manned, powered vehicles designed to travel through the air.
AIRSPACE	<ul> <li>An area of space assigned for aircraft operations, with definite boundaries indicated by ground features or electronic means.</li> </ul>
AIRSPEED (A/S)	- The speed of an aircraft relative to the air through which it moves.
ALERT	- A warning to be ready or watchful.
ALIGNMENT	- The arrangement of parts or components into a straight line.
ALTITUDE	- The height of an aircraft above the ground or above the standard.
AMMO	- Short for ammunition. Anything launched, dropped, fired, or exploded as a weapon.
ANGLE	- The difference between two planes that meet in a point, usually measured in degrees.
AO ,	- Area of operations.

**APPROACHES** 

- Flight paths providing a means or route for reaching a destination, such as a target area or landing zone.

APU

- Auxiliary Power Unit. An electrical generating engine or motor (other than the aircraft's propulsion system) that is used to power essential aircraft equipment required for starting the primary engines and for other operations usually on the ground.

**AREA** 

 A space on the earth's surface or in the air above the earth's surface designated for specific aircraft operations.

ARMAMENT

- All of the guns, weapons, and equipment serving offensive or defensive purposes on an aircraft.

ARTC

- Air Route Traffic Control. An agency that controls the flow and separation of aircraft traveling along specified routes.

ARTILLERY

- Guns of large caliber, too heavy to carry. Mounted guns (exclusive of machine guns) such as cannons and launchers. May be mobile, stationary, or mounted on ships; weapon carriers.

**ATTACK** 

- Offensive acts and maneuvers associated with an assault against an enemy.

ATTITUDE

- The position of an aircraft in relation to a given line or plane, as the horizon.

AUTOTRACK

 A mode of sensor operation with the sensor automatically tracking movements of a target.

AVIONICS

- Electronically powered displays depicting information required by aviators in performance of aviator functions.

BASE

- The location from whence aircraft operations start and end. Location where the aircraft and aviators are assigned and located. The traffic pattern leg flown just before (and usually 90° from) the final approach leg.

BEARING

- The position or direction established by determining the number of degrees away from a known point, usually from the nose of the aircraft. CHANNELS

 A band of frequencies selected to transmit or receive communications.

CHECKS

- The series of steps taken to examine or determine if something is as it should be.

**CLEARANCE** 

- The authorization from a controlling agency to proceed in accordance with a planned flight. The distance between an aircraft and an obstacle during aircraft operations.

CODE(S)

 A set of signals or symbols used in sending messages, information processing, or transferring information from a sensor.

COLLECTIVE

- The flight control that provides the aviator with a means of adjusting the pitch angle of the main rotor blades simultaneously and also the speed of the engine.

CONSTRAINTS

- The restriction or confinement within prescribed limits or boundaries.

CONTENT

- Essential meaning or substance in a written or spoken message.

CONTROL

 A mechanism used to regulate and/or adjust aircraft systems or equipment.

COORDINATE

- Any value of a system of two or more magnitudes used to define a position or a point, usually on a map or on the earth. The value will identify the point of interest.

COURSE

 The movement from one point to another. A way, path, or route of movement. The direction taken, usually expressed in degrees measured from north.

COVER

 A hiding place or area where a helicopter will be hidden or concealed from an enemy.

CYCLIC

- The flight control that provides the aviator with the means of ontrolling the helicopter's movement about the pitch and roll axes.

DAMAGE

Harm or injury to things (targets, aircraft, etc.).

DASH

 A sudden, swift movement of an aircraft to a destination. DATA

- Things known or assumed; facts and figures from which conclusions can be inferred; information.

DESCENT

- A downward flight path.

DESIGNATOR

A device or capability of a sensor to point out;
 to mark; to indicate or to specify.

DESTINATION

 The place toward which someone or something is going or sent.

DIMENSIONS 7

- Extent, size, shape of objects or targets.

DIRECTION

- The point or line along which a threat or target is moving or lies.

DISPENSER

- A container designed to give out or distribute its contents in predetermined portions.

DISPLAY(S)

- Arrangements of instruments, indicators, or electro-optical viewing surfaces on which information can be coded and presented to aviators.

DISTANCE

- The interval between two points, objects, lines, etc.

DOPPLER

 A self-contained navigation system providing worldwide navigation without ground-based aids by comparing the magnitude of change in the frequencies or wavelengths transmitted with those received.

DRIFT

- The deviation of an aircraft from its flight path or hover position because of wind.

ENGINE .

- The power plant that propels the aircraft through the air.

EQUIPMENT

- Supplies, furnishings, apparatus onboard the aircraft or carried by a crew member.

**EVASION** 

- The avoidance of a threat.

FAC

- Forward Air Controller. A member of the tactical air control party who, from a ground or airborne position, controls aircraft engaged in close air support of ground forces.

FA0

- Forward Air Observer. A member of the tactical air control party who, from a ground or airborne position, observes aircraft engaged in close air support of ground forces and reports on results of the engagement.

FCC

- Fire Control Computer. An automatic data processing device for calculating weapon parameters and for controlling weapon firing operations for maximum engagement effectiveness.

FIRE

- A discharge of firearms or artillery; shooting.

FIX

 The position of an aircraft determined from the bearing of two or more known points or radio signals.

**FORMAT** 

- The general makeup, arrangement, or organization of a message.

FORMATION

 An arrangement or positioning of airplanes in flight.

**FORMS** 

 Printed documents with blank spaces to be filled in to report on aircraft or mission status and results.

FOV '

- Field of view. An area of observation as through a sensing device or from a visual position.

FREQUENCY

- The method of identifying (usually in Hertz or cycles per second) specific carrier waves used in radio communications and for radio navigation equipment.

FUEL

 Material burned by the engine to produce power for the aircraft.

GO-AROUND

- Maneuver flown after an abortive landing approach.

GROUND FORCES

- Generic term for all ground combatancs, friendly or enemy.

GROUND SCOUT

- A soldier or other ground-based observer locating targets and providing instructions normally provided by aviators in scout aircraft.

G/S

- Groundspeed. Effective speed across the ground.
Airspeed adjusted for the effect of wind.

GÚN

 A weapon consisting of a metal tube from which a projectile is discharged by the force of an explosive.

HANDOFF

- An offensive maneuver in which target information is transferred from a scout to an attack aircraft or from one attack aircraft to another.

**HEADING** 

- The direction an aircraft is moving, usually expressed as a compass reading.

HIT

- A blow from a weapon as it strikes its mark.

HLH

 Heavy Lift Helicopter. A large rotary-wing aircraft designed to pick up and transport heavy equipment.

HOMING SIGNAL

 A radio transmission that can be received by an aircraft or weapon and is used to guide the aircraft homeward or toward a goal and/or a weapon toward a target.

HOVER

- A mareuver in which the helicopter is flying suspended in the air near one place.

HOVER HOLD

 An automatic flight control feature, without pilot control instruments, for maintaining steady hover conditions.

HOVER TURN

 A repositioning of the nose of a helicopter from one direction to another while flying suspended in the air near one place.

**IDENTIFICATION** 

- A mode switch on an IFF Penal. When selected, the IFF electronically transmits an identification code.

IFF

 Identification Friend or Foe. An electronic system for recognition of friendly aircraft.

ILS

- Instrument Landing System. A system of radio signals that transmits precise landing course and glide path information to be translated by aircraft instruments and interpreted by aviators, thus enabling recovery of aircraft during adverse weather conditions.

IMPACT

- The contact and resulting destruction when a weapon strikes a target.

**INDICATORS** 

- Devices such as gauges, dials, registers, or printers that measure and visibly display information required by crew members.

INSTRUMENTS '

- Devices for indicating or measuring condition, performance, position, direction of flight, and operation of aircraft subsystems.

ITEMS '

- Particular things or units in an inventory or a list of things.

JOIN-UP

- A flight maneuver performed with the objective of entering and becoming a member of a formation of aircraft, or the completion of a planned rendezvous with another aircraft.

LANDMARK

 A prominent feature of the landscape serving to identify a particular locality or position of an aircraft or target.

LASER

- (Light Amplification by Stimulated Emission of Radiation). A device in which atoms, when stimulated by focused light waves amplify and concentrate the waves, then emit them in a narrow, intense beam. Used as a sensor to designate, aim, and direct a weapon or measure range.

LASER CUE

 A mode of operation enabling a sensor to receive target location from a laser.

LASER RANGEFINDER (LRF)

- A device that emits a focused beam of amplified light waves onto a distant object or target in order to measure range.

LIFT-OFF

- The upward movement of a helicopter as it leaves the ground.

LINE OF SIGHT (LOS) - An imaginary straight line joining the center of the eye of an observer with the object viewed.

LOCATION

- An area marked off or designated for a specific purpose.

MANEUVER(S)

- Any change of movement by a flying aircraft.

MAP

- A printed representation of the earth's surface showing ground features, such as mountains, bodies of water, roads, cities, etc. MAXIMUM POWER

- The maximum torque the engine is capable of developing based upon the pressure altitude, temperature, and calibration factors for the aircraft.

**MEDEVAC** 

- Medical evacuation. A mission flown for the purposes of evacuating casualties from a battle area.

MESSAGE

- A communication passed or sent between aviators by speech, electro-optical, or other signal means.

MISSION

- A specific combat operation assigned to an aircraft and its crew.

MODE(S)

 A manner or way of operation, the methods of employment.

MOVEMENT

- A change of location of an aircraft, troops, tanks, etc., as part of an operation or maneuver.

NAP OF THE EARTH (NOE)

- The airspace close to the earth amidst trees, ridges, and other terrain or man-made features providing concealment for helicopters in flight.

**OBSERVATION** 

- Reconnaissance to gain information about the terrain and enemy.

**OVERWATCH** 

- Surveillance of terrain on which an enemy might be positioned in order to provide warning to riendly helicopters in the flight formation; a maneuver flown by helicopters in formation where surveillance is performed by one helicopter crew while the others move concealed by masking; the surveillance functions alternate! tween members of the formation as the movement proceeds.

**PATH** 

- A route of flight movement to a destination.

**PATTERN** 

- A prescribed route or movement for the flow of aircraft traffic; a grouping or distribution such as from a number of bullets, rockets, or missiles when they are fired at a mark.

**PEDALS** 

- The controls in a helicopter operated by the feet with the primary purpose of counteracting torque, thus maintaining nose alignment and aircraft heading as desired, and for coordinating force vectors during turns.

**PERCENTAGE** - The amount or number expressed in rate per hundred. - A particularly or precisely specified location, POINT place, or spot on a map, course, or in a target area. POSITION - The place where an aircraft, target, landing zone, or other operational thing is, especially in relation to others or to a system of navigation. - The capacity of the aircraft propulsion system in POWER terms of the rate at which it can produce energy for flight. PREPOINT A sensor mode in which the sensor automatically slews to a preselected set of coordinates. **PRESSURE** - A force exerted against a control lever in order to execute flying maneuvers or stabilize flight. PULL-OUT - The act of maneuvering an aircraft from a steep descent into level or climbing flight. PULL-UP - The act of maneuvering an aircraft from a descent or level flight into a climb and higher altitude. - An alarm, auditory or visual, indicating that the RADAR WARNING aircraft is being tracked by radar. RADIO - An electronic set capable of transmitting and receiving messages carried by electromagnetic through prescribed energy space, within frequencies. - The maximum effective distance that an aircraft RANGE can operate without refueling; or that a weapon can effectively fire its projectile. RATE OF DESCENT - The amount of altitude being lost in a descent per unit of time, usually expressed in feet per minute. RECEIVER - An electronic device that converts incoming electromagnetic energy or electrical signals into

audible or visual signals.

RECORD

RECORDER

- The report of events stored in a reading device.

- A device for recording mission data or messages.

REPORT

 An account of facts or the record of some observation or event.

RETICLE

- A network of fine lines, wires, etc. in the focus of a sensor or sight used to aid alignment or aiming.

**RPM** 

- Revolutions per minute. Applies to the speed that a rotor is turning in helicopter operations.

RUN

- The approach to a target made by an attacking aircraft.

SAS

- Stabilizer Augmentation System (SAS). A system that provides short term damping of aircraft dynamics in the pitch, roll, and yaw axes, thus enhancing the stability and handling qualities of the helicopter.

SCAN

A systematic search pattern from an electronic sensor.

SCOUT

- An aircraft sent out to observe, reconnoiter the strength, movements, etc. of the enemy and to direct attacking aircraft against enemy targets.

**SEARCH** 

- An act of scrutiny, inquiry, or examination in an attempt to find something (i.e., a target), gain kno ledge, establish facts, etc.

SECURITY

- A radio device or mode of operation that enables communication not likely to be intercepted by an enemy listener.

SENSOR

- Any of various optical or electronic devices designed to detect, measure, or record physical phenomena such as radiation, heat, pressure, etc., and to respond by transmitting information, initiating changes, or operating controls. Specifically, any such device used to search, detect, identify a target or ground reference, and which may respond by guiding or controlling the aircraft or weapons.

SEPARATION

 The airspace or distance between two aircraft flying in formation.

SHIFT

- A change in the observed frequency of a wave, as a light, sound, etc. caused by an increase or decrease in the distance between the source and the observer. With doppler, the change in frequency of the electromagnetic energy.

SIGHT

 A device used to aid the eyes in lining up a gun, or electro-optical sensor on a target or objective.

SIGHTING

- The act of seeing an object or target.

SIGNAL

- A sign or event fixed or understood as the occasion for prearranged combined action. A sign given by gesture, flashing light, etc. to convey a command, direction, warning, etc. An object or device, as a red flag, flashing light, etc. processing such a sign.

STATION

- A post, position, or location where an aircraft is assigned for duty or operations.

**STATUS** 

 The state or condition as of a weapon or an aircraft system.

SURROUNDINGS

- The things, conditions that are present in a given place or within view of an observer.

SURVEILLANCE

- A watch kept over a target or battle area.

SWITCH

 A device used to activate, open, close, or divert an electric circuit associated with an aircraft system or control.

SYMBOL

 A written or printed mark, letter, abbreviation, or geometric form standing for an object, quality, or process.

SYSTEM

 A set or arrangement of components so related or connected as to form a unity or organic whole and used to perform an aircraft function.

TACAIR

 Tactical aircraft. Term used to designate friendly fighter aircraft providing close air support to ground and helicopter operations against an enemy.

TARGET(S)

- An objective, goal, tanks, force, etc. that is the object of a military attack.

T.D.

- Touchdown. The act of touching down or landing an aircraft; the moment at which a landing aircraft touches the landing surface.

TERMINAL AREA

 The region where aircraft flights end and where servicing facilities and resources are maintained. TERRAIN

 Ground or earth, especially with regard to its natural or topographical features or fitness for some use.

THREAT

- The source of danger and potential destruction from an enemy force, such as artillery, tank, or aircraft.

THROTTLE

- The control that regulates the amount of fuel being metered to the engine(s).

T.O.

- Takeoff. The act of leaving the ground in an aircraft. The place from which an aircraft leaves the ground, the starting point for a flight.

**TRACERS** 

- Bullets or shells that indicate their own courses in the air with trails of smoke or fire, so as to facilitate adjustment of the aim.

TRACK

- A course or line of ilight, route, way; the projection of the flight path of an airplane on the surface of the earth.

TRAFFIC

- The movement of a number of aircraft along prescribed routes or flight paths, usually in landing or takeoff operations, but also in operations involving multiple aircraft.

TRANSMITTER

- The part of a radio or other electromagnetic device that generates waves, modulates their amplitude or frequency, and sends them by means of an antenna.

TRIGGER

 A small lever, switch, or part which when pulled or pressed activates the firing of a weapon.

TURN(S)

 A change in direction of flight. An aircraft maneuver resulting in a change of course or direction of flight.

UPDATE

 An action taken or a function performed to revise navigation data making it more accurate or concurrent with present aircraft status or position. UTM

- Universal Transverse Mercator. A conventional system for indicating position on the earth's surface. The earth's surface is divided into grids which are 1000 meters square. A position is easily defined in UTM coordinates by a prefix (e.g., B5) which represents a 100,000 x 100,000 meter area followed by easting (3 digits) and northing (3 digits) coordinates which locate a spot within 10 meters.

WAYPOINT

- A preselected navigation checkpoint along a planned route of flight. Location of the checkpoints are stored in the doppler and are called up for navigation purposes during the flight.

WEAPON

- An instrument or device of any kind that can be used to fight or to attack an enemy target.

#### III. ABBREVIATIONS AND ACRONYMS

A - Auditory
A/C - Aircraft
Ack - Acknowledge
Adj - Adjust
Align - Alignment

AO - Area of Operations

C - Cognitive
Comm - Communication
DEK - Data Entry Keyboard
Discrim - Discrimination

FCC - Fire Control Computer
FFAR - Folding Fin Aerial Rockets

FOV - Field of View
Ident - Identification
Interp - Interpretation

LHX - Light Helicopter Experimental

LOAL - Lock-On After Launch
LOBL - Lock-On Before Launch

LOS - Line of Sight LRF - Laser Rangefinder

Nav - Navigation

NOE - Nap of the Earth
Orient - Orientation
P - Psychomotor

PE - Performance Element
PGM - Precision Guided Missile

Recog - Recognition

S-R - Stimulus-Response Sec(s) - Second(s)

Symb - Symbol, Symbolic

Tgt - Target V, Vis - Visual A P P E N D I X B
SEGMENT SUMMARIES

# A P P E N D I X B

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Phase	Reconnaissance

Segment 1: Bomb Damag	e Assessment Meth	nod
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE	Monitor Threat Warning Displays	
Establish Position (Observation)		
Hover Masked	Check A/C Systems	
Unmask Sensor		Survey Target Area
	,	Assess Damage
Hover Masked		
	Transmit Report (Digital)	

Phase

Reconnaissance

Segment 2: Evade Radar	Lock-On Metho	od
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE		
	Respond to Threat Warning Signal	
Deploy to Cover		
	Transmit Message	
Hover Masked		

Phase	Reconnaissance	

Segment 3: Reconnaissa	nce, General Meth	od
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE	Monitor Threat Warning Displays	
Establish Position (Observation)	Check A/C Systems (Power Change)	
Unmask Sensors		
		Survey Target Area
Hover Masked		,
	Record Target Data	
	Prepare Report	
	Transmit Report (Digital)	
Unmask Sensor		
	Update Doppler	
	,	Monitor Terrain, Aerial Approaches to Area of Operations
Maneuver NOE	:	

### Phase Reconnaissance

Segment 4: Record Sightings		Method		
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY		
Hover Masked	Check A/C Systems			
Unmask Sensor				
	Update Doppler			
		Survey Target Area		
		Acquire Position Data		
Mask Aircraft	Record Target Data			
	Record Target Data			
	4			

Segment 5: Tactical M	ovement Metho	od
LIGHT CONTROL	SUPPORT	MISSION ACTIVITY
over Masked	Check A/C Systems	,
	Check Course Required	
Inmask Sensor		
	,	Monitor Terrain, Aerial Approaches
	Transmit Message	
laneuver NOE		
		Monitor Terrain, Aerial Approaches
ask Aircraft		
nmask Sensor		
	Monitor Threat Warning Display	
		Monitor Terrain, Aerial Approaches
	Transmit Message	

Phase Reconnaissance	· '	and the second s
Segment 6: Transmit Re	port Me	thod Digital
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
•		Prepare Report, Digital Message Device
		Transmit Report, Digital

Phase Target Service	e	,
Segment 7: Acquisition	nMeth	od Auro Search
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor		
		Receive Handoff (Laser Cueing)
	Transmit Message (Target Detected)	

Phase Target Service

Segment 8: Acquisition Method From Laser Cueing FLIGHT CONTROL SUPPORT MISSION ACTIVITY Hover Masked Check A/C Systems Receive Message Unmask Sensor Survey Target Area Acquire Position Data (Marking Round Impact Point) Mask, Aircraft Record Target Data Transmit Report Digital

Segment 9: A	djustments	, Area Weapons	Metho	od_Digital	
FLIGHT CONTROL	1	SUPPORT	ļ	MISSION ACTIVITY	1
Hover Masked		Check A/C Systems			
		Receive Message			,
Unmask Sensor	,			Survey Target Area	
	·			Estimate Adjustments	
Mask Aircraft					
	,	Transmit Message (Adjustments)	,		
		, , *			
	•		: :		
		· :			
	•	, ,			

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
1 LIGHT CONTROL	DOLLOKI	MIODION ADITATIT
Hover Masked	Check A/C Systems	
•	1	
	Receive Message	
Unmask Sensor		Survey Target Area
onders benoon		ou vey larger area
		Estimate Adjustments
1		
Mask Aircraft		
•	Transmit Message (Adjustments)	
	1	1 -
	'	
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Phase	Target	Service	•
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Segment 11:	. Designate fo	r Precision	Guided Missile	Method
000,000,00	Debignate It	A LECCESION	Outucu Hissiic	riectiou

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	
		Track Target
	Receive Message (Fire Coordination)	
	Receive Message	
	,	Designate Target
Deploy to Cover		
	·. `	

Segment 12:	Engagement,	Air-to-Ground	Method	Autonemous,	Lock-On
•			•		

•	. 1	After Launch
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	
( *	Displays	
, ,		Track Target
•		
		Acquire Position Data
		Prepare Weapon
	j	
Align Heading on Target		
Bearing		
Unmask Aircraft		
Designate Target		
(Continue Until Weapon		
Impact)		
,		Fire Weapon
•		
Deploy to Cover		
•		
		-
1		
•		

ı	1	Before Launch
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	
<b>,</b>		Track Target
		Estimate Range
Align Heading on Target Bearing		
		Prepare Weapon, Laser
Unmask Aircraft		
		Designate Target (Continue Until Missile Impact)
<b>,</b>		Fire Weapon
Deploy to Cover		
		,

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked -	Receive Message (Target Handoff)	
	Record Target Position Data	
	Check Course Required	
Maneuver NOF		
Hover Masked	Update Doppler	
	Check A/C Systems	
		Prepare Weapon
	Transmit Message (Attack Coordination)	
nmask Aircraft		
		Fire Weapon
	Transmit Message (Brief, "Shot")	
ask Aircraft		

Segment 15: Engagement, Soft Targets Method Cannon Fire, Hover				
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY		
Maneuver NOE	·			
Hover Masked	Check A/C Systems			
	Receive Message (Coordinate Attack)			
Maneuver NOE				
Establish Position Firing				
		Prepare Weapon(s)		
lign Heading on Target earing				
nmask A/C	٠.			
		Acquire Position Data		
· ·		Fire Cannon		
eploy to Cover				

Phase	Target Service			
Segment	16: Engagement,	Soft Targets	Method FFAR, Di	rect
		,	1	

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked -	Check A/C Systems	
	Receive Message (Target Handoff Data)	
	Record Target Position Data	
	Check Bearing and Range	
Maneuver NOE		
Establish Position (Firing)		
Hover Masked	Transmit Message (Coordinate Attack)	
		Prepare Weapons
Align Heading on Target Bearing		
Unmask Aircraft		
		Estimate Range
		Fire Weapon
Deploy to Cover		

Phase	Target Service	1	
	201000 0021200		
ı		1	

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor -	Monitor Threat Warning Displays	
,		Acquire Position Data
Mask Aircraft		/
	Record Target Data	
	Transmit Report (Handoff Message)	
,		

Phase Target Service

			-		
		,		•	
0		M 4	10 - 41 - 1	11 - 1	
Segment 19:	Handoff, Ground	larget	Method	voice	
0-0					

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Unmask Sensor	Monitor Threat Warning Displays	
	Maintain Track Target With Target	
		Acquire Data
Mask Aircraft		
		Acquire Position Data
Mask Aircraft		
	Transmit Message (Target Handoff)	

Phase	Target Service	4	
			<del></del>

LIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Inmask Sensor -	Monitor Threat Warning Displays	
		Track Target
		Handoff Target Using Laser Cueing

Phase	Tar	get Serv	ice	 		·
Segment	20:_	Holding	Checks	Metho	d	
			1	' 1		

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked		
The state of the s		
	Hadara Danalan	· ·
	Update Doppler	
		·
	Check A/C Systems	
•		
	Check Sensors	
•	Transmit Message (Coordinate With Team)	
	(ooordinate with ream)	
	. '	
1		
•		
•		·

Phase	Targ	get Servi	ce				 	
			•	ı				
Segment	21:	Overwatc	h		Me	ethod	 '	

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE -		
Hover Masked	Update Doppler	
	Check A/C Systems	
Unmask Sensor		
		Maintain LOS With Target
		Monitor Terrain, Aerial Approaches
	Monitor Threat Warning Displays	
		Check Sighting
	Transmit Message (Threat Alert)	

Segment 22: Receive H	andoff Meth	nod
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked -	Check A/C Systems	
	Receive Message • (Handoff)	
	Record Target Data	
	Note Bearing and Range	

Phase	Γε	rget	Serv	ice

Segment 23: leam Coordination Method	Segment 23:	Team Coordination	Method
--------------------------------------	-------------	-------------------	--------

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Maneuver NOE -	Monitor Threat Warning Displays	
	Check A/C Systems	
		Survey Target Area
•	Transmit Message (Coordinate Establish- ment of Kill Zones)	
		Establish Position (Firing)
Establish Firing Position		
Unmask Sensor		
		Monitor Terrain, Aerial Approaches
		Approaches
·		

Phase	Target	Service,	Air-to-	Air

		•	•	,		
Segment 24:	Acquisition	•	Method	Free	Search	

FLIGHT CONTROL	SUPPORT	MISSICN ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor	Monitor Threat Warning Displays	
		Monitor Terrain, Aerial Approaches
		Detect Aerial Threat
	1	
	Transmit Message (Alert Team)	
	Maintain Sensor LOS With Target	
·		
		Estimate Range

Method From Masked Position

Estimate Range

Prepare Weapon

Track Target

Fire Weapon

#### Phase Target Service, Air-to-Air

Segment 25: Engagement / ir-to-Air

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked -	Check A/C Systems	
Unmask Sensor		
		Track Target
Align Heading on Target Bearing		

Unmask Aircraft

Deploy to Cover

Phase Target Service, Air-to-Air	•
1	,
Segment 26: Engagement Air-to-Air	Method Running Fire, Cannon

	<u> </u>	
Establish Attack Run	· · · · · · · · · · · · · · · · · · ·	Prepare Weapon
Maintain Separation (Close)		
		Fire Weapon (Cannon)
Deploy to Cover		
	-	

Phase	Target Service,	Air-to-Air	 ,		
			, ,		
Segment	27: Engagemer.t	Air-to-Air	Method_	Running Fire,	Missile_

FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Establish Attack Run		
		Prepare Weapon
Align Heading on Target Bearing	ı	
		Fire Weapon (Missile)
Deploy to Cover		
	Check A/C Systems	
•		

Phase Target Service	e, Air-to-Air			
Segment 28: Handoff Aerial Threat Method Voice				
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY		
Hover Masked	Check A/C Systems			
Unmask Sensor	Monitor Threat Warning Devices			
· · · · · · · · · · · · · · · · · · ·				
		Monitor Terrain, Aerial Approaches		
		Detect Aerial Threat		
	Transmit Message (Threat Alert)			
		Maintain Sensor LOS With Aerial Threat		
	Transmit Message (Coordinate Target Selection)			

Phase Target	Service, Air-to-Air		,
Segment 29: Re	ceive Handof:	Method Voice	
CHT CONTROL	SUPPORT	MISSION ACTIVITY	1

•		
FLIGHT CONTROL	SUPPORT	MISSION ACTIVITY
Hover Masked	Check A/C Systems	
Unmask Sensor	Monitor Threat Warning Devices	
· · · · · · · · · · · · · · · · · · ·		
		Monitor Terrain, Aerial Approaches to AO
n e	,	
	Receive Message (Handoff Data)	
		Survey Target Area
e y M		Detect Aerial Threat
, ,		Detect Reliai inteat
•	Transmit Message (Threat Sighted)	Maintain Sensor LOS With Aerial Threat
•		
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		·

APPENDIX C

FUNCTION ANALYSIS WORKSHEETS

(INITIAL ANALYSES-SINGLE CREWMEMBER)

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14	Detect Aerial Threat, Automatic Search, Cueing	C-17
15	Detect Aerial Threat, Unaided	C-18
. 16	Detect Target (Ground), Free Search	C-19
. 17	Detect Target, Prepoint, Auto Cueing	C-20
18	Establish Position (Firing or Observation	C-21
19	Estimate Range, Automatic	c-22
<b>:0</b> ·	Estimate Range, Unaided Estimation	C-23
21	Fvaluate Position	C-24
. 22	Fire Cannon	C-25
23	Fire Weapon	C-26
24	Handoff Target, Laser Cueing	C-27
25	Hover Masked	C-28
26	Identify Target	C-29
27	Maintain LOS With Target	C-30
28	Maintain Separation Between Aircraft	C-31
29	Maneuver NOE	C-32
30	Mask Aircraft, Lateral	33

FUNCTION NO.	FUNCTION Page
31	Mask Aircraft, Vertical
32	Monitor Terrain, Aerial Approaches
33	Monitor Threat Warning Displays
34	Perform Evasive Maneuvers
35	Prepare Report, Digital Message Device
36	-Prepare Weapon, Fire and Forget/Cannon
37	Prepare Weapon, Laser Cueing
38	Receive Handoff, Laser Cueing
39	Receive Message, Designation Coordination, DigitalC-42
40	Receive Message, Standard, Digital
41	Receive Message (Standard), Radio, Voice
4.2	Record Target Data
43	Respond to Threat Warning Signal
44	Stabilize Aircraft
45	Survey Target Area, Automatic Search
46	Survey Target Area, Manual Control, Visual SearchC-49
47	Survey Waypoint
48	Track Target
49	Transmit Message (Brief), Voice, Brief
50	Transmit Message (Standard), Voice
5,1	Transmit Report, Digital
52	Inmask Aircraft, Lateral
53	Unmask Aircraft, Vertical
54	Unmask Sensor
<b>5</b> 5 .	Update Doppler, Overfly Stored Waypoint
56	Update Doppler, Remote Landmark
57	Estimate Adjustments, Automatic
58	Engagement, Air-to-Air, Establish Artas, Run

.

TOTAL TIME 8.5 seconds (APPROXIMATE)  PERFORMANCE ELFHENTS  VERB OBJECT  16 Align Sight reticle  O4 Activete Laser rangefit  Coordinates (Sensor captu	cle	SUBSYSTEM(S)		HETHOD AU	Automatic			
PERFORMANC Activate Note	cle	SUBSYSTEM(S)		***************************************				
Accivete Accivete Note	T	SUBSYSTEM(S)	WORK	WORKLOAD COMPONENTS		DURATION (SECS)	,	
	T		SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
91	rangefinder	Sensor control/ sight ACS	Visual Align (V-4)	Sight adjustment needed (C-1)	Control pressure (P-4)	'n	Start 5.5	1
		Laser rangefinder AL	"Isual Alignment (V-4)	Laser on target? (C-2)	Switch activation (P-1)	1.5	6.0 - 7.5	
	Coordinates (Sensor capture)	Sensor subsystem Coordinate display NDC	Visual symbolic (V-5)	Encoding (C-4)	i	. <b>v.</b>	8.0 - 8.5	
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	-			FUNCTION AC	Acquire Position Data	ıta	No. C	02
TOTAL TIME 28 (APPROXIMATE)	28 seconds			METHOD Sh	Shift From Known Point	oint	_	
PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	,	DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
16 Align	Sight reticle	Sensor control/ sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressures- (P-4)	<u> </u>	s + 5.5	
36 Select	Wide FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Point usable? (C-1)	Switch activation (P-1)	1.0	6.0 - 7.0	
94 Identify	Landmark	Sensor scene, map NSM	Visual Discrimi- nation (V-6)	Correct Landmark (C-5)	Map Orienta- tion (P-5)	ı.	7.5 - 12.5	•
89 Estimate	Shift (to target)	Sensor scene, map	Visual Discrimi- nation (V-6)	Correct Shift (C-7)	Map Orienta- tion (P-5)	15	13 - 28	
					,			
		, .	·					i de la proposición
			<u>.</u>			-   ·		

E S	TOTAL TIME 34. (APPROXIMALE)	34.5 seconds			METHOD	Align neading on target beating	urker pearin	60.00	
	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		1
VERB		OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CCNTINUOUS	COMMENTS	1
t et	13 Adjust	Heading	Flight Controls Sensor Display FAD	Alignment of bench- marks (V-4)	Heading adjustment needed (C-5)	Direction power adjustment (P-4)	30	s + 30.5	
181	181 Stabilize	Aircraft	Flight controls, surrounding visual field FV	Relative movement in sur-rounding referents (v-2)	Control adjustments to stop drift, heading	Small adjust- ments in power, cyclic antitorque (P-4)	v	29.5 - 34.5	
	ı				(C-1)	,	1 ,	•	
		· .		,					
		14.2			ı				
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(AFFANIMATE) (AFFANIMATE)  PERFORMANCE ELEMENTS  VERB  0BJECT  87 Estimate  target  coverage	spu			METHOD		,	
PERFORMANC Estimate							
Estimate	:LEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINIOUS	COMMENTS
	Percentage of target coverage	Sensor display scent AS	Visual search of terrain (V-6)	What per- centage? (C-7)	LOS Control (P-4)		S - 14.5
79 Determine Ta	Targets disabled	Sensor display scene AS	Visual inspection (V-6)	Destroyed, repairable, usable? (C-7)	LOS control (P-4)	7	S - 14.5
.42 Record Me	Me so a so a	Message device CM	Visual symbolic (V-7)	Format content (C-4)	Keyboard entries (P-7)	\$	15 + 60 Time for PE 1 and PE 2
							Total 14.5 seconds. The two PEs will be performed simultaneous during scan/survey of target area for 14.5
,						<u> </u>	seconds.
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	TOTAL TIME 108	108 seconds		,	۱, ځ	Check Airciair Systems (notaing)	amprour) ema-		1
	(APPROXIMATE)				METHOD				11
•	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	,	DURATION (SECS)		
	VERB	OBJECT	SURSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/	COMMENTS	- 1
	48 Check	Pue 1	Fuel system display DF	Visual symbolic mental calculations (V-5)	Quantity (mission time) (C-6)			S - 10.5	
	50 Check	Engine status displays	Ingine status displays DE	Visual symbolic (V-5)	Within safe limits (C-2)		01	11 - 21	•
	47 Check	Aircraft equipment -	Life support L	Visual inspec- tion (V-6)	Available and operating (C-6)		30	21.5 - 51.5	
	49 Check	Caution/ Warning indicators	Malfunction detection equipment (warning) DM	Visual symbolic (V-5)	No indica- tions jeo- pardizing mission continua- tion (C-2)	Switch operation (P-1)	10	52 - 62	
	52 Check	Cockpit items	Personal equipment p	Visual Inspection (V-6)	Secure (C-6)	1	30	62.5 - 92.5	
	138 Perform	Checklist Items	Checklist PC	Visual reading (V-7)	No condi- tions jeo- pardizing mission continua-	;	15	93 - 108	
	,				(C-6)			Each PE occurs in sequence.	1

	TOTAL TIME 11,5 seconds (APPROXIMATE)	.S seconds	•		METHOD	Check Aircraft Systems (Power Change)	tems (Power o	nange) No. vo	1 1
	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		1
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	J
	14 Adjust	Power	Power control FP		Amount necessary (C-1)	•	. <u> </u>	S + 1.0	
	51 Check	System instruments	Engine and caution displays DEW	Visual symbolic (V-5)	In limits? Desire setting (C-2)	İ		1.5 - 11.5	
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TOTAL TIME 3.0	3.0 seconds	.,		FUNCTION Ch	Check Bearing and Range	ange		No. 07
(APPROXIDATE)				riet mod				
PERFORMAL	PERFORMANCE ELEMENTS		. WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMPRENTS	
170 Select	Weypoint (desired)	Navigation control N	Visual symbolic (V-5)	Correct waypoint? (C-3)	Switch activation (P-2)		S - 1.5	
46 Check	Course, distance to waypoint	Navigation display ND	Visual symbolic (V-5)	Adjustment to heading? (C-5)	<u> </u>		2.0 - 3.0	• '

VERNORMANCE ELPERTS	TOTAL TIME 32. (APPROXIMATE)	32,5 seconds			FUNCTION Ch	FUNCTION Check Sensor Operation	lon	No. 08
Sensor Sensor subsystem Visual Sensor DISCRATEV DISCRATEV Sensor subsystem Visual Sensor Sensor 1.5 (7-6) (7	1	CE ELEMENTS		WORK	LOAD COMPONENTS		DURATION (SECS)	
Sensor subsystem Visual Sensor 1.5  AC finspect (Ce-f) (Ce-f) (Ce-f)  Sensor subsystem Visual Adjust Sensor 30  AC finspect needed finspect needed adjust controls finspect needed finspect ne	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	
Sensors Sensor subsystem Visual Adjust- Sensor 30 AG (V-6) AG (V-6) Adjust- Controls adjust- Contrast ments adjust- Contrast required Projustry (P-2) Adjust- Controls (C-6) Adjust- Controls (C-6) Adjust- Controls (C-6)	168 Select	Sensor(s)	Sensor subsystem AC	Visual inspect (V-6)	Sensor operating (C-6)	Sensor switch (P-1)	1.5	•
-brightness -contrast -contrast -gair -gair -frequency -boresight (C-6)		Sensors	Sensor subsystem AC	Visual inspect (V-6)	Adjust- ments needed	Sensor controls fine	30	2,5 - 32,5
-polarity -frequency -boresight (C-6)	•			,	-brightness -contrast -gair	adjust- ments required		
					-polarity -frequency -boresight (C-6)	(P-2)		
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				Character Ch	Chack Stabiltra		No. 09
90	seconds			 	6		
(APPROXIMATE)				METHOD			
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	,
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
111 Monitor	Surroundings	Visual, unaided V	Visual detect movement (V-2)	Possible sighting? (C-2)	-	50	s + 20.5
192 Survey	Approaches to AO	Sensor display scene AS	Visual Detect Movement (V-2)	Possible sighting? (C-2)	Adjust sensor LOS (P-4)	, ,	s - 20.5
24 Align	Sight	Sensor display sight ADS	Visual align (V-4)	Any sighting (C-2)	Sensor LOS adjustment (P-4)	Ň	21 - 26
- 36 Smlect	Sensor FOV	Sensor controls FOV ACF	Visual monitor (V-6)	Target centered (C-1)	Discrete activation (P-1)	1.0	26 - 27.5
98 Identify	Threst	Sensor displays DIV	Movement, shape, heat signature (V-2)	Level of threat friend/foe (C-4)		10	28 - 38
					,	·	PE 1 and 2 will be continuous throughout function but interrup by PE 3, 4, and 5.
		r				,	
				,			

(APPROXIMATE)	116.5 seconds			METHOD			
PERFORMA	PERFORMANCE ELEMENTS		WOTA	WOLKLOAD COMPONENTS		DURATION (SECS)	,
VERB	OBJECT	SIIBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUCUS	COMMENTS
166 Select	Radio, security	Communication system CS	Vis symbol (V-5)	Correct radio? (C-3)	Switch activation (P-1)	10	s - 10.5
205 Transmit	Message (extended)	Communication system CT	Auditory, message content (A-3)	Encoding (C-4)	Switch activation (P-1)	57	11 - 56
113 Note	Acknowledgement	Communication system CR	Auditory content (A-3)	Verity content established (C-4)	•	<b>S</b>	56.5 - 61.5
			-		·		61.5 - 71.5
69 Coordinate	Mission number	Communication system CC	Auditory, message content (A-3)	Message received? Authenti- cation correct? Mission proc? (C-5)	Switch activation (P-1)	57	71.5 - 116.5
	1						10 seconds delay awaiting PE 4
				,	,		

TOTAL TIME 102.5 seconds  (APPROXIMATE)  PERFORMANCE ELEMENTS  VERB  OBJECT  Communication  Comm							
Communication Communication channels and security Target data Target data Target data Acknowledgement Acknowledgement owher attack			METHOD				1
OBJECT  Communication channels and security Target data  Target data  Target with Acknowledgement ouher attack							
Communication channels and security  Target data  Target data  Acknowledgement Acknowledgement  Actack with other attack		WORKI	WORKLOAD COMPONENTS	-	DURATION (SECS)		
Communication channels and security  Target data  Target data  Target data  Acknowledgement Acknowledgement Acknowledgement Acknowledgement	SUBSYSTEM(S) S	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	-
Target data  rd Target data  message (brief) Acknowledgement Acknowledgement  ouher attack	Communication 8 system 8 CS	Visual sysbolic (V-5)	Adequacy of setting -equipment operating- (C-3)	Selector switches, speech (P-1; P-3)	<u>1</u> 0	s - 10.5	
Target data Message (brief) Acknowledgement  te Attack with ouher attack	Communication A system	Auditory (A-3)	Authentic message required (C-6)		30	11 - 41	
Message (brief) Acknowledgement Le Attack with ouher attack	sage device	Visual symbolic (V-5)	Encoding (C-4)	Keyboard entries (P-1)	10	41.5 - 51.5	
Attack with other attack	Communication A system (CT	Auditory (V-3)	Encoding recall (C-4)	Switches, speech (P-1; P-3)	<b>ب</b>	52 - 57	
	Communication System CC	Auditory (A-3)	Target assessment Firing schedule (C-5)	Transmitter switches (P-1)	54	57.5 - 102.5	,
						,	
				,	- The Theory Continues of the Continues	,	

				FUNCTION De	FUNCTION Deploy to Cover			No. 12
TOTAL TIME 18. (APPROXIMATE)	18.5 seconds			METHOD				
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	,	DUTATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPLENTS	
43 Check	Obstacle clearance	Outside visual field V	Visual inspection (V-1)	Adequate clearance (C-2)	•	un ,	s - 5.5	
83 Establish	Dash	Flight control F	Visual, relative movement (V-2)	Control adjustment needed? (C-1)	Control Pressure (P-4)	່ ຕ	5.5 - 8.5	,
181 Stabilize	Aircraft	Flight controls, outside visual field	Visual, detect movement (V-2)	Control adjustment needed? (C-1)	Control pressure (P-4)	, •	8.5 - 13.5	, '
143 Reduce	Altítude	Flight controls, outside visual field FV	Visual, relative movement (V-2)	Control adjustment needed (C-1)	Control pressure (P-4)	<u>ب</u>		,

No. 13							(			,		,	
			COMMENTS	s · 5.5	6 - 7.0	7.5 - 10	10.5 - 20.5	21 - 26	26.5 - 17	1	,	ı	
		DURATION (SECS)	DISCRETE/ CONTINUOUS	<b>w</b>	1.0	2.5	10	, '	'n				
Designate Target			PSYCHOMOTOR	Control Pressure (P-4)	Discrete activation (P-1)	Discrete activation 'P-1)	Discrete activation (P-1)		Discrete activation (P-1)			1	
FUNCTION Des	METHOS	WORKLOAD COMPONENTS	COGNITIVE	Adj needed (C-1)	Target centered? (C-1)	Laser ready? (C-2)	Target lased? (C-2)	Target hit? (C-2)	Laser safe? (C-2)	,		,	ı
l		WORKI	SENSORY	Vis align (V-4)	Vis monitor (V-1)	Vis symb (V-5)	Vis detection (V-2)	Vis monitor (V-1)	Vis symb (V-5)	,			
,			SUBSYSTEM(S)	Sensor control sight ACS	Sensor control FOV ACF	Laser controls ACL	Laser designator ALD	Sensor display AD	Laser cont ACL		r,		
	seconds	E ELEMENTS	OBJECT	Sight reticle	Narrow FOV	Laser designator	Laser designator	Weapon impact	Laser	, ,	-		,
	(APPROXIMATE)	PERFORMANCE ELEMENTS	VERB	16 Align	36 Select	33 Arm	02 Activate	125 Note	72 De-Arn				

TOTAL TIME 31. (APPROXIMATE)	31.5 seconds			FUNCTION DE	Detect Aerial Threat Altomatic Search, Cueing	heing	No. 14	
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		_
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
190 Survey	Airspace	Sensor display AS	Visual monitor (V-1)	Cueing symbol? (G-2)	-	20	S + 20.5	
76 Detect	Gueing symbol	Sensor display AT	Visual symbolic (V-5)	Signal detection (C-2)		v	21 - 26	
16 Align	Sight reticle	Sensor control sight AGS	Visual alignment (V-4)	Target centered? (G-1)	Control press. (P-4)	<b>~</b>	26.5 - 31.5	<u>-</u>
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				ELIMETTON DA	Detect Aerial Threat	ıt	No.	ม
TOTAL TIME 31 seconds	seconds			1 -	Unalded			
(APPROALTMAE)				'				
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		,
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
191 Search	Airspace	Visual, unaided V	Visual survey (V-1)	Area clear? (C-6)	1	12.5	S + 13	
74 Detect	Movement	Visual, unaided V	Visual detect (V-2)	Signal (maneuver) (C-2)	1 1 1	8	13 - 15	
176 Direct	Sensor (to target)	Sensor controls a/c direction indicated AC	Visual align (V-4)	Approx bearing to sighting? (C-6)	Control pressure (P-4)	<u>'</u>	15.5 - 20.5	
99 Identify	Ihreat	Visual, unaided V	Visual; movement shape (V-2)	Orientation of a/c. Type of a/c. (C-4)		'n	21 - 26	
98 Identify	Threat	Sensor threat display (visual) DIV	Movement shape heat signature (V-2)	Level of threat Friend/ foe (C-4)	,	10	21 - 31	
97 Identify	Threat	Sensor threat display (aural) DI	Tone(s) continu- ous or intermit- tent (A-3)	Type of threat a/c. Level of threat (C-4)	. ,	10	21 - 31	
			,				No transition time provided to first discrete PE (2).	<b>y</b>
				,			ı	
								•

TOTAL TALE   20.5 Seconds			1		FUNCTION	FUNCTION Detect Target (Ground)	nnd)	No. 16
PERFORMANCE FLEMENTS		.5 seconds			METHOD	ee Search		
Search   Target area   Sensor display   Visual   Area clear?   Control   12.5 S + 1	PERFORMA	NCE ELEMENTS		WORK	CLOAD COMPONENTS		DURATION	
Target area Sensor display Visual Area clear? Control 12.5 S + 1 (1.65)	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	
Movement Sensor display Visual Signal 2 13-  Scene detection (movement) 2 13-  Getection (movement) 2 13-  Sight Sensor display (Visual alignment Centered pressure ADS (C-2) (C-2) (P-4)	147 Search	Target area	Sensor display scene AS	Visual survey (V-1)	Area clear? (C-6)	Control pressure (LOS) (P-4)	12.5	\$ + 13
Sight Sensor display/ Visual Target Control 5 15.5  ADS (V-4) (C-2) (P-4)  (P-4)	75 Detect	Movement	Sensor display scene AS	Visual detection (V-2)	Signal (movement) (C-2)	,	7	
	24 Align	Sight	Sensor display/ sight ADS	Visual alignment (V-4)	Target Centered (C-2)	Control pressure (P-4)	'n	
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17	7,7								
	Ž			COMPENTS	s - 1.0	1.5 - 2.5	& ! E	8 - 13	
		Bu	DURATION (SECS)	DISCRETE/ CONTINUOUS	v.	1.0	<b>v</b>	٠ <u>.</u>	
	Detect Target	Prepoint, Auto Cueing		PSYCHOMOTOR	i	Switch activation (P-1)	İ	Control pressure (P-4)	
1	FUNCTION De	METHOD Pr	WORKLOAD COMPONENTS	COGNITIVE	Data complete? (C-6)	Prepoint option (C-3)	Signal recogni- tion (C-2)	Target centered? (C-2)	
			WORK	SENSORY	Visual symbol (V-5)	Visual symbol (V-5)	Visual symbol (V-5)	Visual alignment (V-4)	
	•	*		SUBSYSTEM(S)	FCC display ID	Sensor controls ĄC	Sensor display/ target cue AI	Sensor display (sight) ADS	
	,	seconds	PERFORMANCE ELEMENTS -	OBJECT	Target data in FCC	Sensor prepoint	Cueing symbol	Sight	
		TOTAL TIME 13 seconds (APPROXIMATE)	PERFORMANC	VERB	209 Verify	165 Select	76 Detect	24 Align	

!	servarion) No. 18			COMMENTS	S + 21.5	s + 21.5	.5 - 10.5	11 - 16	16.5 - 21.5	PE 1 and PE 2 continuous throughout function overlapping PE 3, 4, and 5.
	Firing or Ob	DURATION		CONTINUOUS	21.5	21.5		<b>S</b>	٧.	
	Establish Position (Firing or Observation)		1	PSYCHOMOTOR	Flight control pressures	Control pressures (P-4)			Control pressures (P-4)	
ı	FUNCTION ESC METHOD	WORKLOAD COMPONENTS		COGNITIVE	Verify Clarance (C-2) (P-4)	Course adjustment needed?	Decoding (C-4)	Adequate space,	Adjustments needed? (C-1)	
		WORKI	-	SENSORY	Visual detect (V-2)	Visual symbol (V-5) (C-5)	Visual symbol (V-5)	Visual inspect masking? (C-2)	Visual detect movement (V-2)	
,				SUBSYSTEM(S)	Flight controls outside visual FV	Nav display Filght controls NDF	Outside visual map VM	Outside visual V	Flight controls Outside visual FV	
,	21.5 seconds	PERFORMANCE ELEMENTS		OBJECT	Obstacle clearance	Course	Position	Obstacle clearance	Aircraft	
	TOTAL TIME 21.5 (APPROXIMATE)	PERFORMANC		VERB	103 Maintain	92 Follow	55 Ch.ck	43 Check	181 Stabilize	

TOTAL TIME TO	1		٠		COLLEGE NAMES			NO. 19
Ì	TO seconds	,		METHOD	Automatic			
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
,	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	so.	s - 5.5	
36 Select	FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6 - 7.0	
04 Activate	Laser range finder (LRF)-	Sensor/LRF AL	Visual align signal (V-4)	Target lased? (C-2)	Discrete activation (P-1)	1.5	7.5 - 9	
132 Note	Range	Sensor display/ range AR	Visual discrim (V-5)	In range? (C-6)		٠,	9.5 - 10	
				,				1
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		·	,			1		1

				FUNCTION ES	Estimate Range		No.	20
TOTAL TIME 33 (APPROXIMATE)	33 seconds		· · · · · · · · · · · · · · · · · · ·	METHOD	Unalded Estimation			
PERFORMAN	PERFORMANCE ELEMENTS		NORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	<u>'</u>	s - 5.5	
36 Select	FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6.0 - 7.0	,
135 Note	Tgt/mil dimensions	Sensor display AD (V-6)	Vieual discrim dimension (C-6)	Evaluate target pressure (P-4)	Sight control	٠	7.5 - 12.5	
88 Estimate	Range	Sensor display AD	1 1 1	Estimation (C-7)	<u> </u>	20	13 - 33	
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VERB	l	TOTAL TIME 46.	46.5 seconds			FUNCTION EV	Evaluate Position		N.	No. 21
VERS		(APPROXIMATE)				TELINO.				
OBJECT   SUBSYSTEM (S)   SENSORY   OCCUITIVE   PSYCHOMOTOR   OUTSINGLEY		PERFORMAL	NCE ELEMENTS		WORK	LOAD COMPONENTS		DURATION (SECS)		
Surroundings Sensor display Visual, Area safe? Sensor Scene Sensor Sensor Sensor Sensor Sensor Sensor Sensor Sensor Sensor Outrols Visual Where to Sensor Sensor AC (V-1) (C-1) (C-1) (C-1) (V-1) (C-1) (V-1) (C-1) (V-1) (C-1)	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/	COMMENTS		
Sensor Sensor controls Visual Where to Sensor  AC Survey point? controls controls  Visual access Sensors, maps Visual Adequate Sensor  NSM Ción FOV? (P-4)  (V-6) (C-6) (P-4)	<del> </del>	193 Survey	 	Sensor display scene AS	Visual, movements, shapes (V-2)	Area safe? (C-6)	Sensor controls (P-4)	20	S + 20.5	;
Visual access Sensors, maps Visual Adequate Sensor 20 area controls from FOU? (P-4) (V-6) (C-6)		177 Siew	Sensor	Sensor controls AC	Visual survey (V-1)	Where to point? (C-3)	Sensor controls (P-4)	<b>S</b>		
		39 Check	Visual access	Sensors, maps NSM	Visual inspection (V-6)	Adequate area FOV? (C-6)	Sensor controls (P-4)	20	26.5 - 46.5	•
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TOTAL TIPE 15 seconds  (APPROXIMALE)  PERFORMANCE ELEMENTS  VERB  207 Verify    Adjusted sight alignment    alignment    Cun trigger  136 Observe   Tracers, impact  11. Adjust   Alignment  71 De-arm   Cun	SUBSYSTEM(S) Sensor display scene	ANON	FUNCTION F1	Fire Cannon		, vo.	23
PERFORMANC PERFORMANC Perify Activate Adjust De-arm	SUBSYSTEM(S) Sensor display	ANO.	METHOD				
PERFORMANC Activate Observe Adjust De-arm	SUBSYSTEM(S) Sensor display scene	NO",					
Verify Activate Observe Adjust De-arm	SUBSYSTEM(S) Sensor display		WORKLOAD COMPONENTS		DURATION		
	Sensor display scene	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COPPENTS	
	- AS	Visual, symbolic (V-5)	Verify sight picture (C-2).		2	S + 2.5	
	Fire control system I		Trigger post- tion. Recognize (C-2)	Switch activation (P-1)	ň	2.5 - 3.0	
	Sensor display sight ADS	Visual trace (V-3)	On target (C-2)		٠	3.5 - 8.5	
,	Sensor display sight	Visual align (V-4)	Adjustment needed (C-1)	Control pressures (P-4)	'n	9 - 14	
	Fire control system	Visual, symbolic (V-5)	Gun secured (C-2)	Switch or switch switch (P-1)	s.	14.5 - 15	•
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VERB OBJECT SUBSYSTEM(S) SENSORY C G STRINGS OBJECT SUBSYSTEM(S) SENSORY C G STRINGS OBJECT STRINGS OBJECT STRINGS OBJECT STRINGS OBJECT STRINGS OBJECT STRINGS OBJECT STRINGS OF STRINGS O					
Fire control discussion of the control discrimination of the apon fire control discrimination of the control discrimination of		METHOD	1		
SUBSYSTEM(S) SENSORY Fire control Visual display nation (V-5) Weapon Fire control Visual system (V-2, A-1) Weapon Fire control Visual system (V-2, A-1)  Fire control Visual system (V-2, A-1)  Fire control Visual system (V-2, A-1)  Visual system (V-5)	WORKE	WORKLOAD COMPONENTS		DURATION (SECS)	
Firing con- straints met display  display  (V-5)  Weapon  Fire control  Weapon  Fire control  Weapon  Fire control  Wisual  System  (V-2, A-1)  Fire control  System  (V-5)  (V-5)  (V-5)  (V-5)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Weapon Fire control Visual System I (V-2, A-1) Weapon Fire control Visual System System (V-5) I (V-5)	Visual discrimi- nation (V-5)	System ready? (C-6)	Control pressures (P-4)	<u>-</u>	S + 5.5
Weapon Fire control Visual symbolic I (V-5)	Visual Auditory (V-2, A-1)	Weapon shot? (C-2)	Switch activation (P-1)	. 3	80 •
	Visual symbolic (V-5)	Weapon sys- tem secured (C-2)	Switch activation (P-1)	sec/ switch	8.5 - 9
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				FUNCTION Ha	Handoff Target, Laser Cueing	ser Cueing	No. 24
TOTAL TIME 38 (APPROXIMATE)	38 seconds		٠.	METHOD			
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
196 Transmit	Message (brief) alert	Communication system (transmit)	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	s	S + 5.5
113 Note	Ack/ready	Communication system (receive)	Auditory. Interpret (A-3)	Decoding (C-4)	•	٠ <u>.</u>	6 - 11
196 Transmit	Message (brief) Alert for sensor cue	Communication system (transmit)	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1,P-3)	ار د	11.5 - 16.5
16 Align	Sight reticle	Sensor control/ - sight ACS	Visual align (V-4)	Adjustment needed (C-1)	Control pressure (C-4)	<b>v</b>	17 - 22
02 Activate	Laser designator	Laser designator ALD	Visual detect (V-2)	Signal recognition (C-2)	Switch activation (C-1)	10	22.5 - 32.5
113 Note	Ack/tgt detected	Communication system (receive) CR	Auditory interpret (A-3)	Decoding (C-4)		v,	33 - 38
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VERB OBJECT  16 Align Sight reticle on target  36 Select Narrow FOV  96 Identify Target	SUBSYSTEM(S) Sensor control/ sight ACS Sensor controls, FOV ACF Sensor display AD	SENSORY Visual alignment (V-4) Visual monitor (V-1) Visual inspect	COGNITIVE Sight adjustment needed? (C-1) Target centered?	PSYCHOMOTOR Control pressures (P-4)	DURATION (SECS)		
Align Select Identify	Subsystem(S) Sensor control/ sight ACS Sensor controls, FOV ACF Sensor display AD	Visual alignment (V-4) Visual monitor (V-1) Visual	Sight adjustment needed? (C-1) Target centered?	PSYCHOMOTOR Control pressures (P-4)	T DISCRETE/		
1. t.	Sensor control/ sight ACS Sensor controls, FOV ACF Sensor display AD	Visual alignment (V-4) Visual monitor (V-1) Visual inspect	Sight adjustment needed? (C-1) Target centered?	Control pressures (P-4)	CONTINUOUS	COMMENTS	
		Visual monitor (V-1) Visual inspect	_ Target centered?		5	s + 5.5	
	Sensor display AD	Visual	(1-2)	Switch activation (P-1)	1.0	6 - 7.0	
		(A-6)	Friend or foe? Type of target (C-6)	None	'n	7.5 - 12.5	
			,				
				1	,		

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No. 27		•					1	•	*				ı		
			COMMENTS	S + 1.5	S + 45.5	S + 5.5			' '			,			
rget		DURATION (SECS)	DISCRETE/ CONTINUOUS	1.0	54	<b>~</b>	· · · · · ·		,						
FUNCTION Maintain LOS With Target			PSYCHOMOTOR	Switch activation (P-1)	Control pressure (P-4)	Control pressure (P-4)	1					1			,
FUNCTION Ma	METHOD	WORKLOAD COMPONENTS	COGNITIVE	Adjustment needed? (C-1)	Match slew rate (C-3)	Planning search (C-5)	,		,			,			·
		WORK	SENSORY	Visual monitor (V-1)	Visual align (V-4)	Visual aim (V-4)	,	-		,	1			,	
			SUBSYSTEM(5)	Sensor controls, FOV Aur	vensor control AC	Sensor control AC	•			, .			,		
	45.5 seconds	PERFORMANCE ELEMENTS	OBJECT	Wide FOV	Target	TOS	•				1				
	TOTAL TIME 45.5 (APPROXIMATE)	PERFORMANC	VERB	36 Select	194 Track	145 Regain									

No. 28		,				Time estimate for PE 1 overlaps continuous PE 2. PE 2 time will vary with mission requirements.
craft			COMMENTS	s + 15.5	s + 40.5	Time estimate for Proverlaps continuous PE 2. PE 2 time vil vary with mission requirements.
Between Air	,	DURATION (SECS)	CONTINUOUS	15	07	
Maintain Separation Between Aircraft			PSYCHCMOTOR-		Control pressure (P-4)	
FINCTION MA	TE LINO	WORKLOAD COMPONENTS	COCNITIVE	Verify relative position (C-2)	Adjustments needed (C-1)	
	•	HORK	SENSORY -	Visual, detect movement (V-2)	Visual, detect relative movement (V-2)	
	•		SUBSYSTEM(S)	Visual sensor display VD	Flight controls; outside visual; sensor display	
40,5 seconds		PERFORMANCE ELEMENTS	OBJECT	A/C movement	Separation	
TOTAL TIME 40.5	(APPROXIMATE)	PERFORMAN	VERB	110 Monitor	105 Maintain	

No. 29					Al Mildings				PE 1, 2, and 5 continuous during entire function, overlapping discrete PE 3 and 4.			,	
			COMPLENTS	s + 80	s + 80	s + 10	. + 3	- 80 + S	PE 1, 2, and 5 continuous during enti function, overlapping discrete PE 3 and 4.		i.		
		DURATION (SECS)	DISCRETE/ CONTINUOUS	80	8	10	m	. 80				1	
Maneuver NOE			PSYCHOMOTOR	Control pressures (P-4)	Control pressures (P-4)	Control pressures (P-4)		Control pressures (P-4)			,		
FUNCTION Ma	- METHOD	WORKLOAD COMPONENTS	COGNITIVE	Verify clearance (C-2)	Select appropriate filght modes (C-3)	Decoding (C-4)	Selection -(C-3)	Anticipating directional adjustments (C-5)			,		,
		WORK	SENSORY	Visual detect (V-2)	Visual detect movement (V-2)	Visual symbol (V-5)	Visual symbol (V-5)	Visual symbol (V-5)					,
			SUBSYSTEM(S)	Outside visual Flight controls FV	Outside visual Flight controls FV	Outside visual Navigation display	Outside visual Navigarion display	Navigation display, flight controls NDF	1				
•	seconds	PERFORMANCE ELEMENTS	OBJECT	Obstacle clearance	Flight modes	Position	Flight path	Course	;				. ,
,	TOTAL TIME 80 seconds (APPROXIMATE)	PERFORMAN	VERB	103 Maintain	12 Adjust	56 Check	164 Select	92 Follow		1 '		ı	

l		,			FUNCTION MA	Mask Aircraft, Lateral	ral	Nc. 30
	(APPROXIMATE)	11.5 seconds			METHOD	,		
	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION	
		mout av	CITECVCTEM(C)	Adosnas	COCNTTIVE	PSYCHOMOTOR	DISCRETE/	COMMENTS
	VEKB	OBJECT	OUDDICTEL O)	DEMOORE	200000000			
	40 Check	Obstacle clearance (lateral)	Outside visual field V	Visual inspection (V-1)	Adequate clearance (C-2)		C1	S + 2.5
	84 Establish	Drift	Fiight controls	Visual, relative movement (V-2)	Control adjust needed (C-1)	Control pressures (P-4)	<b>S</b>	2.0 - 7
	181 Stabilize	Aircraft	Flight controls Outside visual fleld	Visual detect movement (V-2)	Control adjustment needed? (C-1)	Control pressures (P-4)	<u>د</u>	6.5 - 11.5
								All three PEs overlap. Subtract 1 second overlap between PE 1 and 2; and 1 second overlap between 2 and 3.
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FUNCTION Mask Aircraft, Vertical No. 31	METHOD	MORKIOAD COMPONENTS DURATION (SECS)	COGNITIVE PSYCHOMOTOR CONTINUOUS COMMENTS	Verify 5 5 + 5.5 descent path clear (C-2)	Control         Control         5         5 - 10           ad ustment needed (P-4)         (P-4)         (P-4)	Control         Control         5         9 - 14           adjustment         pressures         (P-4)           needed         (P-4)           (C-1)         (C-1)	All three PEs overlap in time. Subtract 1 second overlap between PE 1 and PE 2 and 1 second overlap between PE 2 and 3.	
	<b>~</b> ,	WORKLO	SENSORY	Visual Visual Inspect declearance (V-1)	Visual Carrelative acmovement no ((V-2)	Visual Cartect are relative novement ((V-2)		
			SUBSYSTEM(S)	Outside visual field V	Flight controls Outside visual field FV	Flight controls Outside visual field FV		
	14 seconds	PERFORMANCE ELEMENTS	OBJECT	Obstacle clearance (lateral and vertical)	Altitude	Aircraft		
	TOTAL TIME 14 8 (APPROXIMATE)	PERFORMANC	VERB	43 Check	143 Reduce	181 Stabilize		

TOTAL TIME 30. (APPROXIMATE)	30.5 seconds			FUNCTION MO	FUNCTION Monitor Terrain, Aerial Approaches METHOD	erial Approac	hes No. 32	
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLUAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
177 Slew	Sensors	Sensor control AC	Visual survey (V-1)	Were to point (C-3)	Sensor control pressures (P-4)	<u>v</u>	. 5.5 + 8	
107 Monitor	Approaches	Sensor display scene AS	Visual survey (V-1)	Select slew rate (C-3)	Sensor control pressures (P-4)	30	5 + 30.5	
24 Align	Sight	Sensor display (sight) ADS	Visual align (V-4)	Possible sighting? (C-2)	Sensor control pressures (P-4)	'n	6 + 30.5	
36 Select	Narrow FOV	Sensor control FOV ACF	Visual monitor (V-1)	Sighting centered (C-1)	Switch activation (P-1)	1.0	11.5 + 30.5	·
							Continuous PEs 1 and 2 overlap each other and PE 3 and 4. PE 3 and 4 will be repetitive during the function	d 2 and nd e
,							period whenever a possible sighting occurs.	
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No. 33									, ,		
			COMMENTS	S + 5.5		1		1	•		
Displays		DURATION (SECS)	DISCRETE/ CONTINUOUS								
Monitor Threat Warning Displays	,	<del></del>		\$						,	
onitor T		S	PSYCHOMOTOR			,					
FINCTION		WORKLOAD COMPONENTS	COCNITIVE	Signal recognition (C-2)	,					ı	1
		WORK	SENSORY	Auditory, visual, signal detection (V-2)			ı				,
			SUBSYSTEM(S)	Threat displays DI				· ·,			
	5,5 seconds	PERFORMANCE ELEMENTS	OBJECT	displays		4					
	TOTAL TIME 5.5	PERFORMANC	VERB	<b>donitor</b>							1

				FUNCTION Pe	Perform Evasive Maneuvers	heuvers	No.	*
TOTAL TIME 30 (APPROXIMATE)	30 seconds			METHOD				
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
140 Perform	Hard turns	Flight controls F	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	30	s + 36	
35 Change	Altitude sharply	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	15	S + 15	,
34. Change	Alrspeed	Fiight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	4	4 +	
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				FUNCTION FE	Prepare Report			
TOTAL TIME 121 seconds (APPROXIMATE)	seconds			METHOD D1	Digital Message Device	vice		
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
61 Clear	Display	Message device CM	Visual symbol (V-5)	Ready? (C-2)	Switch activation (P-1)	e.	S + 3.5	
54 Check	Transmission mode	Message device, CM	Visual symbol (V-5)	Right radio? Secure? (C-3)	Switch activation (P-1)	2	9 - 4	<del></del>
160 Select	Format	Message device CM	Visual symbol (V-5)	Proper format? (C-5)	Serial discrete (P-7)	2	6.5 - 8.5	
82 Enter	Message	Message device CM	Visual symbol (V-5)	Encoding (C-4)	Serial discrete (P-7)	108.5	9 - 117.5	· · · · · · · · · · · · · · · · · · ·
80 Enter	Address code(s)	Message device CM	Visual symbol (V-5)	Correct address code? (C-3)	Serial discrete (P-7)	m	118 - 121	
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(APPROXIDATE) PERFORMANCE ELEM	IMATE) PERFORMANCE ELEMENTS		NON	MORKLOAD COMPONENTS		DURATION		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPENTS	
171 Select	Weapon	Fire control (panel)	Visual symbolic (V-5)	Selection (C-3)	Switch activation (P-1)	\$	5*5 ÷ S	
57 Check	Weapon status	Fire control display ID	Visual symbolic (V-5)	Verify (C-2)	<u> </u>	H	1 9	,

PERFORMANC VERB								
	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR.	CONTINUOUS	COMMENTS	
171 Select	Weapon		Visual symbolic (V-5)	Selection (C-3)	Switch activa- tion	<b>م</b>	s + 5,5	
149 Select	Laser code	Fire control panel IP	Visual symbolic (V-5)	(P-1) Enter code (C-4)	Control switches (P-1)	មា	6 - 11	· .
57 Check	Weapon status	Fire control display ID	Visual symbolic (P-5)	Verify (C-2)	į	<b>-</b>	11.5 - 12.5	
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				FUNCTION Re	Receive Handorr		•	
(APPROXIMATE)	38.5 seconds		,	METHOD	Laser Cueing			
RFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
	Message alert	Communication system (receive)	Auditory interp (A-3)	Decoding (C-4)	•	<b>~</b>	s + 5.5	
196 Transmit	Message (brief) Ack/Ready	Communication systems CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	<b>S</b>	6 - 11	
	Sensor	Sensor control AC	Visual monitor (V-1)	Where to point (C-3)	Control pressures (P-4)	<b>'</b>	11.5 - 16.5	
	Alert (lasing)	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	i i	<b>v</b>	17 - 22	
	Cueing symbol	Sensor display AT	Visual symbol (V-5)	Signal recog (C-2)	* * *	'n	22.5 - 27.5	
	Sight reticle	Sensor control ACS	Visual align (V-4)	Automatic (C-1)	Control pressures (P-4)	<b>"</b>	28 - 33	
196 Transmit	Ack message (target detected)	Communication system CI	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	'n	33.5 - 38.5	1
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TOTAL TIME 10. (APPROXIMATE)	10.5 seconds			METHOD D1	Digital	<b>G</b>		
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
129 Note	Message alert	Message device CM	Auditory detect Visual symbol (A-1) (V-5)	Signal recognition (C-2)		2	s + 2,5	
173 Send	Message (Ack/Ready)	Message device CM	Visual symbol Auditory symbol (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	, <b>n</b>	3 - 3.5	,
134 Note	"Splash" signal	Message displant	Visual symbol Auditory signal (V-5) (A-1)	Signal recognition (C-2)	· .	2	8.5 - 10.5	1
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FUNCTION Receive Message, Standard

TOTAL TIME 30 (APPROXIMATE)	30 seconds		1 4	METHOD DI	Digital			
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
129 Note	Message alert	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Signal recog (C-2)		2	S + 2.5	
173 Send	Message (Ack/Ready)	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	٠.	3 - 3.5	
121 Note	Message content	Message display CM	Visual read (V-7)	Decoding (C-4)		25	4.0 - 29	
173 Send	Message (Ack/Roger)	Message device CM	Visual symbol Auditory signal (V-5)	Response select (C-3)	Switch activation (P-1)	'n	29.5 - 30	<i>t</i> :
			(A-1)					
			. ,			,	•	
						•		1

	,			FUNCTION Re	Receive Message (Standard)	tandard)	No. 41	
(APPROXIMATE)	seconds	•		METHOD	Radio, Voice			
PERFORMAN	PERFORMANCE ELEMENTS	,	WORJ	WORKLOAD COMPONENTS	8	DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPRENTS	
128 Note	Message alert	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)		5	× + × ×	
196 Transmit	Message (brief) Ack/Ready	Communication system (transmit) CI	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	<b>~</b>	6 - 11.5	
127 Note	Message	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)		25	12 - 37	
70 Copy	Data	Personal Equipment Cockpit items P	Visual symbolic (V-5)	Encoding (C-4)	Symbolic production (P-6)	10	37.5 - 47.5	
196 Transmit	Message (brief) Ack/Roger	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activator (P-1, P-3)	<b>~</b>	48 - 53	l.
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FUNCTION Record Target Data

							*	
FORMANCE	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
-	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
-	Display -	Message device CM	Visual symbolic (V-5)	Verify ready (C-2)	Switch activation (P-1)	e e	S + 3.5	<del></del>
	Target data	Target keyboard system (FCC) AK	Visual symbolic (V-5)	Encoding (C-4)	Data entry (P-7)	35	39	
	Target data	Target keyboard system (FCC) AK	Visual symbolic (V-5)	Select storage option (C-3)	Switch activation (P-1)	prof.	39.5 - 40.5	<del></del>
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FUNCTION Respond to Threat Warning Signal No. 43 METHOD	WORKLOAD COMPONENTS DURATION (SECS)	COGNITIVE PSYCHOMOTOR CONTINUOUS COMMENTS	Decoding S S + 1.0	Signal 3 1.5 - 4.5 evaluation (C-6)	Select Switch 2 5-7 option activation (P-1)	
PU ME	WORKLOAD	SENSORY COC	Auditory Dec. (G (A-4)	Visual Sig align, eva (V-4)	Visual Sel symbol (C-(C-(C-5))	
		SUBSYSTEM(S)	Threat warning display DT	Ihreat warning display DIV	Chaff dispenser switch .SC	
seconds	PERFORMANCE ELEMENTS	OBJECT	Acquisition/ lock-on signal	Signal bearing/ distance	Chaff dispenser	
IOTAL TIME 7 se	PERFORMANC	VERB	133 Note	90 Estimate	01 Activate	

No. 44		,	,		,						. ,		
		(	COMMENTS	. <b>.</b>	v + v	\$ + \$	% + %					,	
.		DURATION (SECS)	DISCRETE/ CONTINUOUS	<b>S</b>	'n	<b>5</b>	<b>~</b>		+ ,				4
Stabilize Aircraft		,	PSYCHOMOTOR	Control pressures (P-4)	Control pre;sures (P-+)	Control pressures (P-4)	1				1	1	<u>.</u>
FUNCTION St.	METHOD	WORKLOAD COMPONENTS	COGNITIVE	S-R (C-1)	S-R (C-1)	S-R (C-1)	Verify clear (C-2)	,	,				
,		WORK	SENSORY	Detect vertical movement (V-2)	Detect horizontal movement (V-2)	Detect yaw (V-2)	Visual monitor (V-1)	,	,			,	
			SUBSYSTEM(S)	Flight controls F	Fiight controls F	Flight controls F	Outside visual field V						
	conds	PERFORMANCE ELEMENTS	OBJECT	Altitude	Drift	Heading	Obstacle clearance	,					
	IOTAL TIME 5 seconds (APPROXIMATE)	PERFORMAN	VERB	63 Control	64 Control	66 Control	43 Check						

No. 45					,	4					,	, ,		
			COMMENTS	s + 2.0	2.5 - 3.0	s + 25					ı		. ,	,
		DURATION (SECS)	CONTINUOUS	1.5	1,5	23			·				•	
Survey Target Area	Automatic Search		PSYCHOMOTOR	Switch activation (P-l)	Keyboard entries (P-7)			ı						
FUNCTION Su	METHOD	WORKLOAD COMPONENTS	COGNITIVE	Selection (C-3)	Encoding (C-4)	Signal recognition (C-2)	,						,	
	•	WORK	SENSORY	Visual symbol (V-5)	Visual symbol (V-5)	Visual survey (V-5)		,		,		,	. ,	,
			SUBSYSTEM(S)	Sensor controls AC	Sensor controls AC	Sensor display scene AS	,			.՝				
,	25 seconds	PERFORMANCE ELEMENTS	OBJECT	Auto search	Search pattern, coverage area	Display	,					,		
,	TOTAL TIME 25 8 (APPROXIMATE)	PERFORMANC	VERB	148 Select	169 Select	108 Monitor								

. ;	,						
(APPROXIMATE)	25 seconds			МЕТНОО	Manual Control, Visual Search	sual Search	
FORMANC	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS
	Sensor	Sensor controls AC	Visual survey (V-1)	Select rate, Direction (C-3)	Control pressures (P-4)	5	S + S
	Display	Sensor display scene AS	Visual survey (V-1)	Sign, recognition (C-2)		25	S + 25
					. • • •		PE 1 time overlaps with PE 2.
4					.'		

TOTAL TIME 30 seconds (APPROXIMATE)	seconds	,		FUNCTION Su METHOD	Survey Waypoint			No. 47
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		· ·
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
32 Approach	Waypoint	Navigation display ND	Visual symbolic (V-5)	Further move- ment needed? (C-5)		30	s + 30	
210 Verify	Position	Outside visual map VM	Visual symbolic Visual survey (V-5, V-1)	Evaluative (C-6)	Map orienta- tion (P-5)	. 01	s + 10	
			,	,				
			,			,		s
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				FUNCTION IN	Track Target	-	No.	877
TOTAL TIME 45 seconds (APPROXIMATE)	seconds			METHOD				
PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	-	DURATION (SECS)	l	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPENTS	
16 Align	Sight reticle	Sensor control sight ACS	Visual align (V-4)	Target center (C-1)	Control pressures (P-4)	<b>v</b>	\$ + 5.5	
194 Track	Target	Sensor centrols AC	Visual align (V-4)	Slew rate (C-3)	Control pressure (P-4)	45	6 - 45	
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TOTAL TIME 16 seconds (APPROXIMATE)	seconds			METHOD Vo	Voice, Brief			
PERFORMAN	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS	. /:	DURATION (SECS)		·
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	COMPLENTS	1 .
150 Select	Comm. channel and securicy	Communication system (select) CS	Visual symbolic (V-5)	Correct channel? (C-3)	Switch activation speech (P-1, P-3)	01	s + 10.5	. ,
196 Transmit	Message (brief)	Communication system (transmit)	Auditory speech feedback (A-3)	Message content (C-4)	Switch activation speech (P-1, P-3)	<b>v</b>	11 - 16	
			,					, ,

				FINCTION IN	Transmit Message (Standard)	standard)	No. 50	
TOTAL TIME 37 (APPROXIMATE)	37 seconds			1 1	Voice		,	
PERFORMAN	PERFORMANCE ELEMENTS	,	WORK	WORKLOAD COMPONENTS		DURATION (SECS)		-
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	$\neg$
196 Transmit	Message (brief) alert	Communication systems (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	, ,	5.5 + 5.5	<del></del>
113 Note	Ack/ready	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	ł	۰,	6 - 11	
206 Transmit	Message (standard)	Communication system (transmit) CI	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	50	11.5 - 31.5	ı
113 Note	Ack	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	1	· •	32 - 37	
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		,		FUNCTION Ir	FUNCTION Transmit Report		N	No. 51
TOTAL TIME 7 8 (APPROXIMATE)	7 seconds		•	METHOD D1	Digital			
PERFORMAL	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
173 Send	Message (alert, Ident code)	Message device CM	Visual symbol (V-5) (A-1)	Message sent? (C-3)	Button (P-1)	5.	s + 1.0	
118 Note	Acknowledgement, Authentication code	Message display CM	Visual symbol Auditory signal (V-5) (A-1)	Authentic reply? (C-6)			1,5 - 3,5	
173 Send	Messassassassassassassassassassassassassa	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	٠,	4 - 4.5	
118 Note	Acknowledgement, Authentication code	Message display CD	Visual symbol Auditory signal (V-5) (A-1)	Authentic reply? (C-6)		2	5 - 7	
							V	
						·		
							,	1

				FUNCTION Un	FUNCTION Unmask Aircraft, Lateral	ateral	No	No. 52
TOTAL TIME 21 (APPROXIMATE)	21 seconds			METHOD				
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)-		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	,
40 Check	Lateral clearance	Outside visual field V	Visual inspect (V-1)	Adequate clearance? (C-2)	1	-2	s + 2.5	
84 Establish	Drift	Flight control F	Visual monitor, relative movement (V-2)	S-R (C-1)	Control pressures (P-4)	<b>L</b>	&	
181 Stabilize	Aircraft	Flight controls, Outside visual field FV	Visual, detect relative movement (V-2)	S-R (C-1)	Control pressures (P-4)	un .	8.5 - 13.5	
59 Check	Weapon path clear	Outside visual field V	Visual orient (V-4)	Verify weapon path clear			14 - 21	. '
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No. 53								,	occur sly and y during		·
		_	COMPLENTS	S + 10.5	S + 18	S + 18	11 - 18	. 91 - 11	PE 2 and 3 occur simultaneously and continuously during total time.		
ertical		DURATION (SECS)	DISCRETE/ CONTINUOUS	10	•	5		<b>S</b>	,		'
Unmask Aircraft, Vertical			PSYCHOMOTOR	Flight control pressures (P-4)	Control pressures (P-4)	Control pressures (P-4)		Control pressures (P-4)			
FUNCTION Un	METHOD	WORKLOAD COMPONENTS	COCNITIVE	Verlfy LOS target clear (C-2)	S-R (C-1)	S-R (C-1)	Verify clear of obstacles (C-2)	S-R (C-1)			
		WOR	SENSORY	Visual, detect movement (V-2)	Detect horizon- tal move- ment (V-2)	Detect rotation (V-2)	Visual orienta-tion (V-4)	Visual detect movement (V-2)			
			SUBSYSTEM(S)	Flight controls sensors visual field FVD	Fiight controls	Flight controls F	Visual field V	Flight controls, Outside visual fleld FV		,	
	seconds	PERFORMANCE ELEMENTS	OBJECT	Altítude	Drift	Heading	Weapon path clear	Aircraft			
	TOTAL TIME 18 seconds (APPROXIMATE)	PERFORMAN	VERB	101 Increase	64 Control	66 Control	59 Check	181 Stabilize			

FUNCTION Unmask Sensor

		COMMENTS	s + 10.5	11 - 16	16.5 - 21.5
	DURATION (SECS)	DISCRETE/ CONTINUOUS	0.00		<b>~</b>
	a C	S S	<b>_</b>	۰,	· · · · · · · · · · · · · · · · · · ·
		PSYCHOMOTOR	Control pressures (P-4)	Control pressures (P-4)	Control pressures (P-4)
METTHOD	WORKLOAD COMPONENTS	COGNITIVE	Verify LOS target clear (C-2)	Verify clear (C-2)	Adjustments necessary (C-1)
	WORK	SENSORY	Visual detect movement (V-2)	Visual survey (V-1)	Visual, detect movement (V-2)
		SUBSYSTEM(S)	Flight controls FVD	Sensor display, controls ADC	Flight controls
21.5 seconds	PERFORMANCE ELEMENTS	OBJECT	Altitude	Sensor LOS	Aircraft
TOTAL TIME 21.	PERFORMAN	VERB	101 Increase	53 Check	181 Stabilize

55					4			,	
No.			S		o.	- 12.5	,	- 19.5	
			COMMENTS	s + 5.5	6.0 - 7.0	7.5 - 1	13 - 14	14.5 -	1 .*
	oint	DURATION (SECS)	DISCRETE/ CONTINUOUS	<u></u>	1.0	'n	· 	'n	
Update Doppler	Overfly Stored Waypoint		PSYCHOMOTOR	Orient map (P-5)	Discrete adjustment (P-2)	,	Switch activation (P-1)	Discrete adjustment (P-2)	
FUNCTION Upo	METHOD	WORKLOAD COMPONENTS	COCNITIVE	Confirm location (C-6)	Recall position number (C-4)	Select heading (C-3)	Verify over landmark (C-2)	Recall waypoint desired (C-4)	
		WORK	SENSORY	Visual discrimi- nation (V-6)	Visual symbolic (V-5)	Visual track (V-3)	Visual symbolic (V-5)	Visual symbolic (V-5)	
			SUBSYSTEM(S)	Outsine visual, map VM	Navigation controls NC	Flight controls outside visual field	Navigation controls NC	Navigation controls NC	
	19.5 seconds	PERFORMANCE ELEMENTS	OBJECT	Waypoint	Update mode, preset waypoint	Landmark	Update switch	Navigation mode, next waypoint	
	TOTAL TIME 19.5 (APPROXIMATE)	PERFORMAN	VERB	100 Identify	163 Select	137 Overfly	09 Activate	161 Select	

					<del>,</del>		·					<u>'</u>	·
No. 56				COMMENTS	S + 5.5	. 0.7 - 8	7.5 - 9.0	9.5 - 14.5	15 - 16.5	17.0 - 18.0	18.5 - 22.5		1
			DURATION (SECS)	CONTINUOUS				'n	v	١		<u> </u>	
			5°} <del></del> ∤	CON	<u>"</u>	н	п		1.5	-	۰	<del></del>	<b>,</b>
Update Doppler	Remote Landmark		,	PSYCHOMOTOR	Orient map (P-5)	Discrete adjustment (P-2)	Switch activation (P-1)	Control Pressures (P-4)	Switch activation (P-1)	Switch activation (P-1)	Discrete adjustment (P-2)		
FUNCTION Up	1		WORKLOAD COMPONENTS	COCNITIVE	Confirm land- mark (C-6)	Recall post- tion number (C-4)	Recall post- tion number (C-4)	Verify land- mark centered (C-2)	Verify feature lased (C-2)	Verify update (C-2) (C-4)	Recall way- point desired (C-4)	,	
			WORK	SENSORY	Visual discrim (V-6)	Visual symbolic (V-5)	Visual symbolic (V-5)	Visual alignment (V-4)	Visual Align (V-4)	Visual symbolic (V-5)	Visual symbolic (V-5)		,
				SUBSYSTEM(S)	Sensor scene display NSM	Navigation controls NC	Navigation controls NC	Sensor display/ sight ADS	Laser range finder AL	Navigation controls NC	Navigation controls NC		,
	22.5 seconds		CE ELEMENTS	OBJECT	Landmark	Preset coordi- nates	Remote update doppler	Sight on landmark	Laser range finder	Update (remote)	Nav mode, next waypoint		
	TOTAL TIME 22.	(ALTRUMATE)	PERFORMANCE	VERB	94 Identify	152 Select	167 Select	24 Align	04 Activate	09 Activate	161 Select		

				FUNCTION ES	Estimate Adjustments	ts	No. 57
TOTAL TIME 22.	22.5 seconds			1	Automatic		,
A THE CASE OF THE	DEDECOMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION	
TENTONIA.	NOE ELEMENTS	,				(SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS
36 Select	Wide FOV	Sensor controls FOV ACF	Visual monitor (V-1)	Adjustment needed (C-1)	Switch activation (P-1)	1.0	S + 1.5
126 Note	Impact point	Sensor scene display AS	Visual detect (V-2)	Verify impact (C-3)		٠,	2 - 7
16 Al1gn	Sight reticle on impact point	Sensor control sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	in .	7.5 - 12.5
36 Select	Natrow FOV	Sensor control FOV ACF	Visual monitor (V-1)	Adjustment needed (C-1)	Switch activation (P-1)	1.0	13 - 14
16 Align	Sight reticle on impact point	Sensor control sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	v,	14.5 - 19.5
04 Activate	Laser range finder	Laser range finder AL	Visual alignment (V-4)	Verify laser on spot (C-2)	Switch activation (P-1)	1.5	20 - 21.5
122 Note	Impact coordinates	Sensor display	Visual symbolic (V-5)	Decoding (C-4)		٠,	22 - 22.5
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FUNCTION ANALYSIS

1,				FUNCTION En	FUNCTION Engagement, Air-to-Air	-Air	No. 58	
TOTAL TIME 20 seconds (APPROXIMATE)	seconds		•	METHOD	Establish Attack Run	nn		
PERFORMA	PERFORMANCE ELEMENTS		ROM	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTY R	DISCRETE/ CONTINUOUS	COMMENTS	
86 Establish	Attack run	Outside visual flight controls FV	Visual, direction (V-4)	Establish closure course (C-3)	Control pressures (P-4)	70	S + 20	
91 Fly	Intercept headings	Outside visual flight controls FV	Visual, rela- tive movement (V-4)	Stop relative movement (C-3)	Control pressures (P-4)	50	s + 20	
106 Monitor	Airspeed	Flight instrument displays FD	Visual, symbolic (V-2)	Check maximum airspeed (C-3)	t 1 1	<b>.</b>	s + 1	
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#### APPENDIX D

SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS (INITIAL ANALYSES—SINGLE CREWMEMBER)

#### APPENDIX D

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FUNCTION FUNCTION NO.	. '
Ol Acquire Position Data, Automatic	
O2 Acquire Position Data, Shift From Known Point	
03 Align Heading on Target Bearing	
04 Assess Damage	
O5 Check Aircraft Systems (Holding)	
O6 Check A/C Systems (Power Change)	1
07 Check Course Required	
O8 Check Sensor Operation	
09 Check Sights	
10 Coordinate Mission	
11 Coordinate Target Selection	·
12 Deploy to Cover	,
13 Designate Target	
14 Detect Aerial Threat, Automatic Search, Cueing	
15 Detect Aerial Threat, Unaided	
16 Detect Target (Ground), Free Search	
17 Detect Target, Prepoint, Auto Cueing	,
18 Establish Position (Firing or Observation	
19 Estimate Range, Automatic	
20 Estimate Range, Unaided Estimation	
21 Evaluate Position	•
22 Fire Cannon	
23 Fire Weapon	
24 Handoff Target, Laser Cueing	
25 Hover Masked	·
26 Identify Target	· ·
27 Maintain LOS With Target	
28 Maintain Separation Between Aircraft	
29 Maneuver NOE	
30 Mask Aircraft, Lateral	1
31 Mask Aircraft; Vertical	
32 Monitor Terrain, Aerial Approaches	

FUNCTION NO.	FUNCTION
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34	Perform Evasive Maneuvers
35	Prepare Report, Digital Message Device
36	Prepare Weapon, Fire and Forget/Cannon
37	Prepare Weapon, Laser Cueing
38	-Receive Handoff, Laser Cueing
39	Receive Message, Designation Coordination, Digital
40	Receive Message, Standard, Digital
41	Receive Message (Standard), Radio, Voice
42	Record Target Data
43	Respond to Threat Warning Signal
44	Stabilize Aircraft
45	Survey Target Area, Automatic Search
46	Survey Target Area, Manual Control, Visual Search
47	Survey Waypoint
48	Track Target
49	Transmit Message (Brief), Voice, Brief
50	Transmit Message (Standard), Voice
51	Transmit Report, Digital
52	Unmask Aircraft, Lateral
53	Unmask Aircraft, Vertical
54	Unmask Sensor
55	Update Doppler, Overfly Stored Waypoint
56	Update Doppler, Remote Landmark
57	Estimate Adjustments, Automatic
58	Engagement, Air-to-Air, Establish Attack Run

	Phase	R	ECO	NNA	<u>ıss</u>	ANCE													
	Segment 1:	B	OMB	DA	MAG	E ASSESSME	ENT				Method								
	" FLI	GHT			1	SUF	POR	T			MIS	sic	ON -			TON	OTA CUR		T .
CUM. SECS.	Function	Ÿ	Λ	С	P	Function	V	A	C	P	Function	·V	A	С	P	v	A	С	P
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50	25	2		1	4											2		1	4
60		2		1	4	06	5		2						-	7		3	4
70	. 54	2		1	4	1										,2		1	4
80		2		2	4	•					46	5		3	4	7		5	8
90		2		2	4							5		3	4	7		5	8
100		2		2	4							5		3	4	7		5	8
110		2		2	4	, ,					04	6		7		8		9	
120	,	2		2	4	1						6		7		8		ò	-
130	25	2		1	4							7		4	7	9		5	11
140		2		1	4	,					·	7		4	7	9		5	11
150		2		1	4							7		4	7	9		5	11
160		2		1	4							7		4	7	9		5	11
170		2		1	4	51	5	1	6	1						7	1	7	5
180	,	2		1	4	t	5	1	6	1						7	1	7	5

Segment 2	:E	IAV	DE R	ADA	R LOCK-ON			,		Method							
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Function	ν̈́	A	С	P	Function	V	A	С	P	Function	v	A	С	P	v	A,	С
29	2		3	4		,									2		3
34	5		5	4	43		4	4		i.					5	4	9
12	2		5	4		5	4	6		·					7.	4	13
	2		6	4										-	2		6
25	2		1	4	'n										2		1
	2		2	4	49	5	1	4	3						7	1	6
					, ,												
				·	,						•						
					·							,					
,										ı							
					·									,			
			,														
,																	
																	T .
	Ī									·							
		Τ		Π		T	Π										T

	Segment 3:	R	ECO	NNA	tss	ANCE, GENE	RAL	<u>-</u>			Method		,						
	FLI	GHT	1		, '	SUF	POR	T	,	,	MIS				1	CON	OTA CUR	L REN	T
M. Cs.	Function	٧	A	С	P.	Function	V	A	С	P	Function	V	A	С	P	V	A	С	P
10	29	2		3	4			,								2		3	4
20		5		4	4	33	2	2	2		,				_	7	2	6	4
30	·	5	Γ	5	4											5		5	4
40	18	1		3	4						,					1		3	4
50		6		5,	4				,							6	,	5	4
60	,	6		6	5	,										6		6	5
70		2		2	4	06	5		2							7		4	4
30	54	2		2	4											2 ·		2	4
90		2		2	4	33		2	2							4	2	4	4
00		2		2	4						45	5	;	4	7	7		6	1
10	. '	2		2	4							5		-2		7		4	4
20		2		2	4						,	5		2		7		4	4
30	25	2	Γ	2	4											2		2	4
0		2		2	4	42	5		2	1						7		4	5
0		2		2 .	4		5		4	7			T		,	7'		6	1
60		2		2	4		5		4	7			Γ			7		6	1
0	· ·	2		2	4		5		4.	7				Γ		7		6	1
30		2	T	2	4		5	1	3	1		T	T	<del> </del>		7		5	5

•	Phase	R	ECC	NNA	ISS	ANCE								,					
	Segment 3:	R	ECC	NNA	ISS	ANCE, GENE	RAI	. (C	ont	.)	Method		1			. <del></del>		· 	
	FLI	GHT	•			SUF	POR	ťΤ	,		MIS	SSI	ON	•		T CON	OTA CUR		T
CUM. SECS.	Function	v	A	С	P	Function	V	A	С	P	Function	v	A	С	P	v	Ą	С	P
190		2		2	4		-5		3	1		,				7		5	5 :
200		2		2	4		5		5	7					_	7		7	11
210	,	2	,	.2	4		5		4	7						7		6	11
220		2		2	4		5	·	4	7						7		٠6	11
, 230		2		2	4		5		4	7	·				,	7		6	11
240		2		2	4	,	5		4	7						7		6	11
250		2		2	4		5		4	7	ŀ					٠7		6	11
260		2		2	4	·	5		4	7		÷				7		6	11
270		2		2	4		5		4	7						7		6	11
280		2		2	4	51	5	1	2	1	45					7	1	4	5
290		2		2	4		5	1	6	1						7	1	8	5
300	54	2		2	4					7.						2		2	4
310		2		2	4	55	6		6	5 .						8		8	9
320	,	2		2	4		5		4	2						7		6	6
330		2		2	4						32	1		3	4	3		5	8
340	,	2		2	4			,				4		4	4	6		6	8
350	29	2		3	4											2		3	4
, 360		5		4	4					Ī.						5		4	4

	Phase	R	ECC	NNA	ISS	ANCE	_										<u> </u>	•	
	Segment 4:	R	ECO	RD	SIC	HTINGS					Method							· · · · · ·	<u>.</u> .
1	FLI	GHT	:			SUF	POF	RT .	·		MIS	SSIC	ON .			CON	OTA CUR		Т
CUM. SECS.	Function	V	A	С	P	Function	V	Å	С	P	Function	V	A	С	P	v	A	С	P
10	25	2		2	4	06	5		2							7.	4.	4	4
20	54	2		2	4				,							2		2	4
30		2		1	4	,									٠	2		1	4
40		2		2	4	56	6		6	5		,				8		8	9.
50		2		2	4		5		4	2	ı		į	,1		7		6	6
60		2		2	4		5		4	4,	,					7		6	8
70		2		2	4				,		45	5		4	7	7		6	11
80		2.		2	4						·	5		2	7	7		4	11
90		2		2	4				,			5		2	,7	7		4	11
100	·	2		2	4						01	4		1	4	6		3	8
110		2		2	4							5		4	1	7		6	5
120	31	1		2												1		2	•
130		2		1	4	55										2		1	4
140	25	2		2	4							•				2		2	4
150		2		2	4	42	5		2	1						7		4	5
160		2		2	4		5		4	7						7.	Γ	6	11
170	29	2		2	4		5		4	7			1			7		6	11
180		2	T	2	4		5		3	1		Γ	Π	Γ		7		5	11

	Phase	R	ECO	NNA	ISS	ANCE							<del></del>						_
	Segment 5:		ACT	ICA	L M	OVEMENT					Method					,			
	FLI	GHT	•			SUI	POF		•		MIS	STC	N				OTA	L REN	T
CUM. SECS.	Function	٧	A	С	P	Function	V	A	С	P	Function	V	A	С	P	v	Α	С	P
10	25	2		1	4	06	5	,	2				ì			7		3	4
20		2		1	4	07	5		5	2						7		6	6
30 <sup>-</sup>	54	2		1	4											, 2		1	4
40		2		2	4			·			32	1		3	4	3		5	8
50		2		2	4							1		3	4	3		5	8
60		2		2	4	,			,			4	,	4	4	6		6	8
70		2		2	4	49	5	1	4	3						7,	1	6	7
80 .	29	2		3	4						·					2		3	4
. <b>9</b> 0		5		4	4						32	1		3	4	6		7	8
100		5		5	4							1		3	4	6		8	8
110	,	5		5	4							4		4	4	9		9	8
120	30	2		2	4	·										2		2	4
130	54	2		1	4	33	2	2	2		,					4	2	3	4
140	·	2		2	4				,		32	1		3	4	3		5	8
150		2		2	4			1				1		3	4	3		5	8
160		2		2	4	-					•	4		4	4	6		6	8
170		2		2	4	49	5	1	4	3						7	1	6	7
180					Γ														

	Segment 6:	T	RAN	SMI	T R	EPORT	<b>.</b>				Method	DIC	IT/	\L					
	FLI	GHT				SUF	POR	T			MIS	SIC	n	•		CON	OTA CUR		T
CUM. SECS.	Function	v	A	С	P	Function	· v	A	С	P	Function	V.	A	С	P	v	A	С	P
10	25	2		2	4	06	5		2							,7		4	4
20		2		2	4	35	5		3	1					7	7	,	5	5
30		2	•	· 2	4		5		5	7		li				7		7	11
40		2		2	4		5		5	7						7		7	11
50		2		2	4	,	5		5	7			٠			7		7	11
60		2		2	4		5		5	7						7		7	11
, 70	1 .	2		2	4		5		5	7						7		7	11
80		2		2	4		5		· 5	7						. 7		7	1.1
90		2		2	4		5		5	7						7		7	11
100		2		2	4	·	5		5	7						7		7	11
,110		2		2	4	,	5		5	7	·					7		7	11
120		2		2	4	,	5		5	7						7		7	11
130		2		2	4		5		5	7						7		7	11
140		2		2	4		5		5	7						7		7	11
150		2		2	4	51	5	1	6	1					<del>                                     </del>	7	1	8	5
160		2		2	4		5	1	6	1		T			<b>\</b> _	7	1	8	5
170							T		Τ	Γ							T		
180			T	T	<u> </u>		T	$\vdash$					T	T		<del>                                     </del>	T	<del>                                     </del>	

	Phase	1	ARG	ET	SER	VICE									•				<u> </u>
	Segment 7:	A	cqu	ISI	TIO	N					Method_	Αl	TO	SEA	ARCH				
	FLI	GHT				SUF		RT	, ,	1	MIS	SIC	N			T CON	OTA		T,
	Function	٧٠	A	С	P	Function	V	A	С	P	Function	V	A	С	P	v	A	С	P
	29	2		3	4	. 49	5	1	4	3						, 7	1	7	7
		5		4												5		4	
		5		5	4		1							,		5		5	4
	25	2		2	4	06	5		2							7		4	4
	,	2		2	4			٠								2		2	4
	54	2		1 ·	4						,				,	2		l	4
	1	2		2	4	33	2	2	2							2	2	4	4
ſ		2		2	4	56	6		4	5						8		6	9
		2		2	4		5		4	4	,			•		7		6	8
		2		ż	4		5		4	2						7		6,	6
		2		2	4						45	5	,	4	7	7		6	ı
		2		2	4						·	5		2		7		4	4
		2		2	4							5	Ţ	2		7		4	4
		2		2	4						16	4.		6	.4	6		8	8
	-	2		2	4	,					26	6		6	4	8		8	8
		2		2	4						. 01	5		4	4	7		6	8
	31	2		2	4						,					2		2	4
I		2		1	4							-				2		1	4

	Segment 8:	<u> </u>	.cqu	ISI	TIO	N					Method_	F	NOM	LAS	ER	CUEI	NG		_
	FLI	GHT	•			SUF	POR	RT .			MIS	SĮC	N			CON	OTA CUR		1
s.	Function	V	A	С	P	Function	V	A	С	P	Function	V	A	С	P	v	A	С	I
0	25	2		1	4	. 06	5		2							7	-	3	I
0		2		2	4											2		2	
0		2		2	4	ı					38		3	4	3	2	3	6	
0	54	2		1	4							1		<sup>'</sup> 3	4	3		4	I
0		2		1	4								3	4		2	3	5	I
0		2		1	4							2		2		4		3	I
0		2	,	1	4							4		4		6		5	I
0 .		2		1	4	49	5		4	3	,		,	,		7		5	
0					1	,				,						·			Ī
0										•	1					,			
0																			1
0		2		2	4		6		6	4									1
0		2		2	4				7										1
0.																			1
0	, ,			-							,								
0																			1
0																	Т	Г	1

	Phase		ARC	ET	SER	RVICE		1			·								
•	Segment 9:	A	DJU	STM	ENT	S, AREA WI	EAP	ONS			Method_	D:	[GI	ral					
,	FLI	GHT	•			sui	PPO	RT		,	MIS	SSI	ON	•	i	CON	OTA		Ť
CUM. SECS.	Function	Ĭ	A	С	P	Function	V	A	С	P	Function	v	A	С	P	v	A	С	P
10	25	2		2	4	06	5		2		1					7	,	4	4
20	,	2		2	4					,						2		2	4
<b>30</b> ,		2		2	4	39	5	1	3	1	t					7	1	5	5
40	54	2		2	4	t.					·.					2		2	4
50		2		2	4						46	3		3	. 4	5		5	8 '
60		2		2	4						,	5		2	4	5		4	8
70	,	2		2	4						01	5		1	4	7		3	8
80	31	2		2	4											2		2	4
90	25	2,	. '	2	4	42	5	,	4	7						7		6	11
100		2		2	4	,	5		3	1						7		5	5
110	,	2		2	4	51 ,	5	1	6	1						7	1	8	5
120		2	,	2	4		5	1	6	1	,	ı				7	1	8	5
130		2		2	4						,					2	·	2	4
140		2		2	4	1								'		2		2	4
150	,	2		2	4				,							2		2	4
160		2		2	4											2		2	4
170																	-	,	<u> </u>
		_	_		_		-	-											

180

	Segment 10	:	ADJ	UST	MEN	TS, AREA W	EAF	ONS			Method_	V	ICI	3					
,	FLI	GHT	•		•	SUE	POF	ŧΤ			MIS	SSIC	N			T CGN	OTA CUR		r
CUM. SECS.	Function	Ÿ	A	С	P	Function	V	Α	С	P	Function	V	A	С	P	v	A	С	P
10	25	2		1	4	06	5		2						·	7	:	3	4
20	1	2		2	4						. ~			,		2		2	4
30		2		2	4	41		3	4	3						2	3	6	7
40.	·	2		2	4			3	4	3						2	3	6	7
50	54	2		1,	4						46	3.		3	4.	5		4	8
60		2		2	4							5	·	2	4	7		4	8
70	-	2		2	4	1					57	4		3	1	6		5	5
80	·	2		2	4							4		1	4	6		3	8
90		2		2	4						יי	5		4	4	7		6	8
100	, 31	2	-	2	4											2		2	4
110		2		1	4											2		1	4
120		Τ				49	5		4	3.	1					5		4	3
130										1	·						T		
140																			
150		T		T								Γ							
160		1	T	T	T		T												
170		1	T	T	1		T	T		Τ				T			T		
180		T	T	T	1		†	1	1	1		T	T	T	T	T	1		T

	Phase		TAR	GET	SE	RVICE							,		<u> </u>				'
	Segment 11	: :	DES	IGN	ATE	FOR PGM					Method_						.*		··
	FI.I	GHT		•		SUF	POF	RT	٠,		MIS	SSIC	N			T	OTA CUR		T ,
CUM. SECS.	Function	Ÿ	A	С	P	Function	v	A	С	P	Function	V	A	С	P	v	A	С	P
10	54	2		2	.4											2		2	4
20		2		2	4	33	2	2	2							4	2	4	4
30		2		2	4						48	4		3	4	6		5	8
40		2		2	4	40	2	1	3	1						4	1	5	5
<b>50</b> ,		2		2	4		7		4	,						9		6	4
60		2		,2	4	·	7		4						·	9		6	4
70		2		2	4		2	1	3	1						4	1	5	5
80		2		2	4	39	5.	1	3	1						7	1	5	5
90		2		2	4		5	1	2		·		,			7	1	4	4
100	,	2		2	4						13	5		, 2	4	7	_	4	8 .
. 110		2		2	4							5		2	1	7		4	5
120	,	2		2	4							5		2	1	7,		4	5
130	· 12	2		5	4.											2		5	4
140		2		6	4											2		6	4
150																			
160														,					
170									T .		·								
180			Γ	Π			Γ	Γ											

,	Phase	,	TAR	GET	SE	RVICE										<del></del>			<del>-</del>
	Segment 12	:	ENG	AGE	MEN	T, AIR-TO-	-GRC	UND	,	,	Method_	Αī	JTO	OMO	US,	LOA	L		· ·
,	FLI	GHT	•			SUE	POR	T.			MIS	SIC	N			T CON	OTA CUR		T
CUM. SECS.	Function	Ÿ	A	С	P	Function	V	A	С	P	Function	V	A	С	P	v	A	С	P
10	54	2		2	4						F					2		2	4
20		2		2	4	33	2	2	2							4	2	4	4
30		2		2	4						48	4		3	4	6		5	8
40		2		2	4	,						4		3	4	6		5	8
50		2		2	4						01	5		4		7	,	6	4
60		2		2	4	. `					37	5		4.	1	7		6	5
70		2		2	4							5		2		7		4	4
80	03	4		5	4				-		٠					4		5	4
90		2		1	4											2		1	4
100	53.	1		2	4											1		2	4.
110		2		1	4											2	·	i	4
120	1	2		2	4	13	5		2	4	,					7		4	8
130	,	2		2	4		5		2	1	23	5.		6	4	12		10	9
140		2		2	4		5		2	1		5	1	2	1	12		6	6
150		2		2	4	ı	5		2	1						7		4	5
160		2		2	2		5		2	1						7		4	5
170	12	2		5	4											2		5	4
180		2		6	4											2		6	4

	Phase		TAF	RGET	SE	RVICE													
	Segment 13			AGE	MEN	T, GROUND	TAI	RGET	<u> </u>		Method	Αl	JTO	NOM	ous,	LOB	L		
	FLI		•			SUF	PPOF	RT.			MIS	SSIC	N			CON			T
CUM. SECS.	Function	٧	A	С	P	Function	V	A	С	P	Function	v	A	С	P	v	A	С	P <sub>.</sub>
10	' 54	2		1	4	33	2	2	2							4	2	3	4
20		2		1	4						48	4		3	4	6		4	8
30		2		2	4	19	4		2	4		4		3	4	10		7	12,
40		2		2	4		5	1	6	1	1	4		, 3	4	11	1	11	9
50	03	4		5	4	÷					37	5		4	1	9		9	5
60	,	4		5	4							5		4	1	9	•	9	.5
70	53	2		2	4	13 '	4		1	4						6		3	8
80		2		2	4	٠,	5		2	1	57	4		3		11		7	5
90		4		2	4		5		2	ı	23	5	1	6	4	14	1	10	9 -
100		4		2	4		5	,	2	1					, ,	9		4	5
110	12	2		5	4					·						2		5	4
120		2		6	4								,			2		6	4
130																			
140																			
150															,				•
160																			
170						·						,		<i>'</i>					
180				Γ						1	·					Ť			

	Phase		TAR	GET	SE	RVICE													
•	Segment 14	·	ENG	AGE	MEN	T, GROUND	TAF	RGET	·		Method_	RI	MOT	re i	ESI	GNAT	ION		· 
٠,	FLI	GHT	•			SUF	POR	RT .			MIS	SSIC	N		"	T CON	OTA CUR		т
CUM. SECS.	Function	v,		С	P	Function	V	A	С	P	Function	V	A	С	Р	v	Α	С	P
10	25	2		2	4	41		3	4	3						2	3	6	7
20		2		2	4			3	4		,			-		2	3	6	4
30		2		2	4			3	4						_	2	3	6	4
40		2		2	4		3		4	6	ı					5		6	10
50	,	2		2	4	,		3	4	3	·			,		2	3	6	7
60		2		2	4	42	5		2	1						7		4	5
70		2		2	4		5		4	7					-	7		6	11
80		2		2	4		5		4	7						7.		6	11
90		2		2	4		5		4	7						7		6	11
100		2		2	4		5		4	7	·					7		6	11
110		2		2	4,	07	5		5	2						7		7	6
120	29	5		5	4										,	5		5	4
130		5		5	4											5	,	5	4
140	25	2		2	4	55	6		. 6	5						8		8	9
150	,	2	1	2	4		5		4	2	·					7		6	6
160		2		2 '	4	06			1 -							2		3	4.
170		2		2	4		5		2							7		4	4
180		2	1	2	4						37	5		4.	1	7		6	5

	Phase		TAR	ĠET	SE	RVICE													
1	Segment 14	:_	ENG	AGF	MEN	T, GROUND	TAF	RGET	. (0	ont	.) Metho	od	RE	10TI	DE:	SIGN	ATI	ON	
	F1.1	GHT	•			sui	POF	tT			MIS	SS10	)N			CON	OTA CUR		r
CUM. SECS.	Function	Ÿ	A	С	P	Function	٧	Α	С	Р	Function	v	Α	С	P	v	A	С	P
190		2		2	4							5		4	1	7		6	5
200		2		2	4	50		3	4	3						2	3	6	7
210		2		2	4			3	4	3						- 2	3	6	7
220		2		2	4			3	4	3		,				2	3	6	7
230		2		2	4			3	4	3			-			2	3	6	7
240,	53 a-c	2		2	4						·					2	٠	2	4
250	ď	4		2	4										,	4		2	4
260		2		1	4											2		1	4
270		2		1	4						23	5	1	6	4	7	ı	7	8
280		2		1	4	49		3	4	3			,			2	3	5	7
290	31	2		2	4											2		2	4
300		2		2	4											2		2	4
310																			
320											· ·			,					
330	·																		
340																			
350												T.	-						

360

	Phase		TAR	GET	SE	RVICE			<del></del>										
	Segment 15	:	ENG	AGE	MEN	T, SOFT TA	RGE	TS			Method_	C/	ANNO	ON I	IRE	, но	VER		
•	FLI	GHT	•		,	SUF	POR	T			MIS	SIC	ON		•	CON	OTA CUR		T
CUM. SECS.	Function	Ÿ	A	С	P	Function	v	Α	С	P	Function	v	A	, C	P	v	A	С	P
10	29	5'		4	4	, ,		,								5		4	4
20	25	2		1	4								i		,	2		1	4
30		1	,	2		06	5		2							6		4	
40		2		1	4	41		3	4	3	·					2	3	5	7
50		2		1	4			3	4							2	3.	5	4.
60		2		1	4	1	ļ	3	4	,						2	3	5	4
. 70		2		1	4	,	5		4	6						7		5	10
80		2		1	4	,		3	4	3			·			2	3	5	7
. 90	29	5		4	4											5		4	4
100		5		4	4											5		4	4
110	18	6		5	4										-	6		5	4
120		6		6	4											6		6	4
130		2		1	4											2 ;		1	4
140		2 -		i	4	. , ,					36	5		3	1.	7		4	5
150	03	4		5	4											4		5	4
160	1	2		1	4											. 2		1	4
170	53	2		2	4											2		2	4
180		4		2	4											4		2	4

	Phase		TAR	GET	SE	RVICE									<del></del>				
	Segment 15	:	ENG	AGE	MEN	IT, SOFT TA	RGE	ETS	(Co	nt.	) Metho	od_	CAN	INO	I FI	RE,	ноч	ER	
	FLI	GHT				SUF	POR	lT.			MIS	SSI	ON			CON	OTÁ CUR		T
CUM. SECS.	Function	v.	A	Ċ	P	Function	V	A	С	P	Function	· <b>V</b>	Α	С	P	v :	A	С	P
190		2		1	4	,										2		1	4
200		2		1	4						01	5		4	4	7		5	8
210		2		1	4	ı					22	3		2	1	.5		3 ·	5.
220		2		1	4						,	5		2	4	7		3	8
230	12	2		5	4											2'		5	4
240		2		6	4											2		6	4
250	,										-	1							
260											,								
270								·											
280																			
290		1																	`
300				į															
310					1														
320													1						
330													Γ						
340		1	T	T				T					T		T				
350			T														1		
360		1	T		<b>†</b>		1			1	,	T	1	T		1			

	Phase		TAR	GET	SE	RVICE													<u>.</u>
	Segment 16	:	ENG	AGE	MEN	T, SOFT TA	RGE	ETS			Method_	F	FAR,	, D1	REC	<u>r</u>			
	FLI	GHT	•			SUF	POF	RT.	1		MIS	SSI	ON			CON	OTA CUR		T <sub>.</sub>
CUM. SECS.	Function	V	A	С	P	Function	v	A	С	P	Function	V	A	С	P	v	A	С	P
- 10	25	2		2	4	06	5		2	,						7		4	4
20 <sup>-</sup>		2		. 2	4	41		3	4	3		,				2	3	6	7
30		2		2	4			3	4		,					2	3	6	4
40		2		2	4		5		. 4	6						7		6	10
50	,	2		2	4			3	4	3						2	3	6	7
60		2		2	4	42	5		4	7	,			,		7		6	11
70	,	2		2	4		5		4	7						.7		6	11
<sup>'</sup> 80		2		2	4		5		4	7		·				7		6	11
90		2		2	4		5		3	1	, '					7		5	5
100		2		2	4	07	5		5	2	,					7		7	6
110	29	2		3	4							,				2		3	4
120		5		4		'										5		4	
130		5		5	4											5		5	4
,140	18	6		6	5		,				,					6	,	6	5
150		6		6	4						·					6		6	4
160	25	2		2	4											2		2	4
170		2		2	4	50		3	4	3						2	3	6	7
180		2		2	4			3	4	3						2	3	6	7

Segment 16	· :	ENG	AGE	MEN	T, SOFT TA	RGE	TS	(Co	nt.	)	- 1	leti	nod_	FF	AR,	DIR	EC'
FL	GHT	•			SUF	POR	T	,		MIS	SSIC	ON			CON	OTA CUR	
Function	v-	A	С	P	Function	v	Α	С	P	Function	v	A	С	P	v	A۴	С
	2		2	4	(Cont) 50		3	4	1						2	3	6
	2		2	4			-			36	5		3	1	7		5
03	4		5	4								,			4		5
	4	)	5	4		,									4		5
53	2		2	4	,										2		2
	2		2	4											2		2
	4		2	4											4		2
	4	<u> </u>	2	4						19	5		.6	4	9		8
	4		2	4						23	5		2	1	9		4
12	2		5	4											2		5
	2		6	4											2		6
																	L'
					'												
								Ŀ									
																	Γ

. S					F,	GROUND TAR	GET	:S			Method_	DI	GIT	AL		.,			_
	FLI			٠		SU	POR	T			MIS	sic	N			T CON	OTA		T
	Function	٧	A	С	P	Function	V	A	, C	P	Function	v	Α	С	P	V	A	С	
	54	2		2	4	33	2	2	2	. 1						4	2	4	
		2		2	4						01	5		4	4	7		6	
	31	2		2	4	42	5		4	7						7		6	
		2		2	4	1	5		4	7						7		6	
		2		2	4		5		4	7						7		6	
		2		2	4	,	5	<u> </u>	4	7						7		6.	
		2		2	4		5		4	7	,					7		6	
	, ,	2		2	4	51	5	1	6	1		1,		_		7.	1	8	
L		2		2	4		5	1	6							7	1	8	
<u> </u>	1	<u> </u>								<u>.</u>							<u> </u>		
				<u> </u>					<u> </u>	Ĺ							Ĺ		
			_					Ļ									L	Ŀ	
	<u>,                                     </u>				_		_			_			_		·			L	
		_	L	_	<u> </u>													L	
		<u> </u>	_	<u> </u>	Ŀ	'				_	,	<u> </u>		_			$oldsymbol{ol}}}}}}}}}}}}}}}$	L	
		_	_		<u> </u>	·			_	_		<u> </u>		_			$oldsymbol{ol}}}}}}}}}}}}}}}}}}$	_	
										Ŀ									

	Phase		TAR	GET	SE	RVICE									1				
	Segment 18	:	HAN	DOF	F,	GROUND TAF	RGET				Method_	V	DIC	2		1			
	FLI	GHT	•			SUF	POR	т			MIS	SIC	ON	1		T CON	OTA CUR		T
CUM. SECS.	Function	v	A	C	P	Function	V	A	С	P	Function	v	A	С	P	V	A	С	P
10	54	2		2	4	33	2	2	2			,	1			4	2	4	4
20		2		1	4						27	3		3	4	5		4	8
30		2		2	4							4		5	4	6		7	8
40		2		2	4						48	4		3	4	6		5	8
- 50	,	2		2	4						01	5		4	4	7		6	8
60	31	'n	L	2		<u>, , , , , , , , , , , , , , , , , , , </u>										1		2	,
70		2	_	1	4		,				_					2 -		1	4
80		2		2	4	50		-3	4	3		. :				2	3	6	7
90	<u></u>	2		2	4			3	4	3	•					2	3	6	7
100		2		2	4			3	4							2	3	6	4
110		L			·														•
120						'	<u> </u>	<u></u>						·					
130																			
140						,													
150	·																		
160											·								
170																			
180											T .								

,	Phase		TAR	GET	SE	RVICE													
	Segment 19	:	HAN	DOF	F T	ARGET					Method_	LA	SEF	CU	EIN	3		<del></del>	_
	. FLI	GHT			•	SUI	POF	lT.			MIS	SIC	ON			T CON	OTA CUR		T
CUM. SECS.	Function	·V	A	С	P	Function	v	A	С	P	Function	v	Α	С	P	v	A	С	P
10	54	2		2	4											2		2	. 4
20		2		2	4	33	2	2	2							4	2	4	4
30	,	2		2	4	,					48	4		3	4	6 (		5	8
40		2		2	4				ı.			4	,	3	4	6		5	8
50		2		2	4						24		3	4	3	2	3	6	7
60		2		2 '	4						i ,	4	3	4	4	6	3	6	8
70	,	2		2	4			·			,	2		2	1	4		4	5
80	,	2		2	4				,				3	4		2	3	6	4
90																			
100																			
110																			
120	-																		
130																			
140												·							
150	٠,										<i>'</i> ,-								
160																			
170																			
180																			

Segment 2	0:_	HOL	DIN	IG C	HECKS					Method_								
FL	IGHT	r		•	SUF	POF	RT	·		MIS	SSIC	ON		1	CON	OTA CUR		Ţ
Function	V	A	С	P	Function	V	Α	С	P	Function	v	A	С	P	v	A:	С	P
25	2		2	4							,				2		2	4
	2		2	4	, 55	6		6	5						8		8	9
	2		2	4		5		4	2	,		,			7		6	6
	2		2	4	05	5		6							7		8	4
	2		2	4		5		2							7		4	4
	2		2	4		6		6							8		8	4
	2		2	4		5		2	1						7		4	5
	2		2	4		6		6						-	8		8	4
	2		2	4		7		6							9.		8	4
	2		2	4	08	6		6	1						8		8	5
	2		2	4		6		6	2						8		8	6
	2		2	4		6		6	2						8		8	6
	2		2	4		6		6	2						8		8	6
í								,		·								Γ
														,				
																	$\Box$	厂
																	Γ	
	T		Π									Г	Г			T	T	

	Phase		TAR	GET	SE	RVICE						· · · · · ·		'			_		
	Segment 21	:	OVE	RWA	тсн		,				Method								_ ,
	FLI	GHT				SUE	POF				MIS		ON	•	•	T	OTA CUR		r
CUM. SECS.	Function	v	A,	С	P	Function	V	A	C	P	Function	V	, A	c	P	V	A	С	P
10	29	5		4	4											5		4	4
20		5		4	4										,	5		4	4
30	25	2		1	4	55	6		6	5					, ,	8		7	9
40		2		1	4		5		4							7		5	4
50		2		1	4	06	5		2		,					· 7		3	4
60	54	2		1	4	33	2	2	2							4	2	3	4
70		2	,	1	4						27	3		3	4	2		4	8
80		2		1	4							4		5	4	6		6	8
90		2		1	4						32	4		4	4	6		5	8
100		2		1	4						09	2		2	4	4		3	8
110		2		1	4							- 6		6	2	8		7	6
120		2		1	4	,										2		1	4
130	31	1		2		49	5		4	3 ,						6		6	3
140		2		1	4	·										2		1	4 .
150	25,	2		2	4										,	.2		2	4
160																			
170																			

180

Segn	ent 22	≥:	KEC	EIV	E H	LANDOFF			<u></u>		Method_	V	DIC	Ε		<del></del> -			_	
	FLI	GHT	,			SUI	POF	ĽΤ			MIS	SŞĮC	ON				OTA	L REN	Т	
Fun	ction	V	A	С	P	Function	V	A	С	P	Function	v	A	С	P	v	A	С	P	
	25	2		1	4	06	5		2							7		3	4	
		، 2	,	1	4	41		3	4	3						2	3	5	7	I
١	,	2		1	4			3	4	٠.						2	3	5	4	
,		2		1	4			3	4							2	3	5	4	I
		2		1	4		5	3	4	6						7	3	5	10	
		2		1	4			3	4	. 3						2	3	5	7	
		2		1	4	42',	5		4	7					,	7		5	11	
		2		1	4		5		4	7					,	7		5	11	
		2		1	4		5	,	4	7						7		5	11	
	٠,	2		1	4		5		4	7						7		5	11	
		2		1	4	07	5		5	2						7		6	6	
																				1
	7					ě ,														
	-		Π						,											_
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180

Segment 23	3:	TEA	M C	OOR	DINATION	111				Method								_
FL.	GHT	•	F		SUI	PPO	RT .			MI:	SSI	ON	•		T CON	OTA CUR		Li
Function	v ·	A	С	P	Function	v	A	С	P	Function	v	A	С	P	V	A	С	
29	2		3	4	33	2	2	2							4	2	Ş	Ī
,	5		3	4						,					5		`3	ĺ
,	5		3	4	06	5		2		. 46	5		3	4	10		5	
٠	5		3	4							-5		3	4	10		6	
	5		3	4							5		3	4	10		6	
•	5		3	4	50		3	4	3						10	3	10	
	5		3	4			3	4	3						5	3	7	
	5		3	4			3	4		'				·	5	3	7	
18	6		5	4											6		5	
	6		6	5											6		6	
	2		1	4											2		1	
54	2		1	4											2		1	
	2		2	4						32	1		3	4	3	,	5	
	2		2	4							4		4	4	6		6	•
	2		2	4.							4		3	4	6		5	
					F							Ţ					Π	
								Π			T							
		T	T	Τ		T		Π	T		T	Τ				T		٠

	Phase		TAF	RGET	SE	RVICE, AIR	R-T(	)-A]	Ŗ										
	Segment 24	:	ACC	UIS	ITI	ON					Method_	FI	REE	SEA	RCH				
,	FLI	GHT	•			SUI	POI	RT.			MIS	ssi	N		٠	CON	OTA CUR		T '
CUM. SECS.	Function	V	A	С	P	Function	V	A	С	P	Function	V	A	С	P	V	A	С	P
10	25	2		1	4	06	5		2		٠,				'	7	·	3	4
20	54'	2		1	4											2		1	4
30		2		2	4	35	2	2	2							4	2	4	4
40		2		.2	4						32	1		3	4	3		5	8
50		2		2	4							4		4	4	6		6	8
60		2		2	4						15	4		6	4	6	,	8	8
<b>70</b> ,		2		2	4							2		4	•	4		6	4
80		2		2	4	49	5	1	4	3						7	1	6	7
90		2		2	4					٠.	27 .	3		3	4	5		5	8
100		2		2	4							4		5	4	6	,	7	8
110		2		2	4	20	4		1	4						9		6	12
120		2		2	4		6		6	. 4						11		11	12
130		2		2	4				7.							2		9	4
140																		'	
150	, .						·	'											
160																			
170							T												
180			T				T	1					,		Г		Γ		

	Phase		TAR	RGET	SE	RVICE, AIF	?-T(	)-A1	R	-									
	Segment 25	:	ENG	AGE	MEN	T AIR-TO-A	IR				Method_	F	RCM	MAS	SKED	POS	ITI	ON	
	FLI	GHT		1		SUI	POP	RT			MIS	sto	N	, ,	ř	CON	OTA		T
M. CS.	Function	٧	A	·C	P	Function	V	A	С	P	Function	v	A	С	P	v	A	С	P
10	25	2		2	4	06	5		2							7	ż	<u>.</u> 4	4
20		2		2	4		5		2		t					7		4	4
30	54	2		1	4						,					2		1	4
40		2		1	4	,					48	4		3	4	6		4	8
50	03	4		5	4							4		3	4	8		8	8
60		2.		1	4							4		3	4	6		4	8
70		2		1	4	20	6		6	4						8		7	8
80	Ţ	2		1	4		6		6	4	•	,				8		7	8
90		2		1	4				7							2		8	4
00		2		1	4				.7							2		8	4
10.		2		1	4						36	5		3	1	7		4	5
20	53	2		2	4											2		2	4
30		4		2	4											4		2	4
40		2	Γ	1	4						48	4		3	4	6	Г	4	8
50		2		1	4							4		3	4	6		4	8
60		2		1	4						23	5	1	6	4	7	1	7	8
70	12	2		5	4	·										2		5	4
30		2	Γ	6	4		Π									2	-	6	4

					T AIR-TO-					Method	R	UNN	ING	FÍR	Έ, α	ANN	ON	_
FL	GH1	Γ			sui	ייייי	кт		1	MIS	SSI	ON		1	CON	OTA		T
Function	v	A	c	P	Function	v	Α	С	P	Punction	v	A	С	Р	v	A	С	
58	4		3	4	,							-			4		3	
	4		3	4	,	Ţ	-		,	.36	5		3	1	9		6	
28	2		2	4	,									. =	2		2	
	2		2	4				·		1	,				2		2	
,	2		2	4	·		·			. 22	5		, 4	4	7		4	
	2	,	2	4			,				5		2	4	7		4	
12	2		5	4	,										. 2		5	
-	2		6	4											2		6	
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TARGET SERVICE, AIR-TO-AIR

Segment 27	·:_	ENC	CAGE	MEN	IT, AIR-TO-	-AII	₹			Method_	RI	JNN I	NG	FIR	E, N	ISS	ILE	<u>:</u>
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### SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--SINGLE CREWMEMBER

	PhaseSegment 28									,			Met	hod	vo	ICE			
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M. CS.	Function	٧	A	С	P	Function	V	A	С	P	Function	v	A	С	P	v	A	С	P
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### SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--SINGLE CREWMEMBER

Segmen	nt 29	:	REC	ElV	E H	ANDOFF					Method_	VC	ICE	<u> </u>					
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Funct	ion	٧	A	С	P	Function	V	A	С	P	Function	V	Α	С	P	V	Α:	С	
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APPENDIX E

FUNCTION ANALYSIS WORKSHEETS

(REVISED TO REFLECT AUTOMATION OF SELECTED SUBSYSTEMS)

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28	Maintain Separation Between Aircraft	,
29	Maneuver NOE	
30	Mask Aircraft, Lateral	

FUNCTION NO.	FUNCTION Page
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TOTAL TIME				HETHOD AN	METHOD Automatic		(R	(Revised)
PERFORMAL	PERFORMANCE ELEMENTS		HOR	HORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ - CONTINUOUS	COMMENTS	
Select	Target location mode	Target acquisition	۷-5	£-3	P-1	1.0		
List	Target(s)	Target acquisition	A-3	c-3	P-3	1.0*		
Note	Coordinates (Sensor capture)	Sensor FCC display	V-5	7-0	•	ð.		1
						Per carget		
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		•		FUNCTION AC	Acquire Position Data	ata)	No. 02
TOTAL TIME 12 (APPROXIMATE)	12.4-32.9 seconds			METHOD	Shift From Known Point	oint	
PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SURSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Align	Sight reticle	Sensor control	Visual alignment (V-4)	Adjustment needed. (C-1)	Control pressure (P-4)	<u> </u>	Precedes PE 2  Each discrete PE occurs
Select	Wide FOV	Sensor	Visual alignment (V-1)	FOV adequate? (C-1)	Switch activation (P-1)	0.1	Total time: 12.9-32.9
Identify	Landmark	Sensor, map	Visual Discrimi- nation (V-6)	Correct Landmark (C-6)	Map Orienta- tion (P-5)	νį	to PE
Estimate	Shift (to target)	Sensor, map	Visual discrimi- nation (V-6)	Correct shift (C-7)	Map orienta- tion (P-5)	១	
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(APPROXIDARE)		<b>V</b>	,	NETHOD A	Automatic		(Revised)
PERFURMA	PERFURMANCE ELEMENTS	,	WORK	WORKLOAD COMPONENTS	10	DURATION (SECS)	
VERB	OBJECT	SURSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPLENTS
Select	Fire mode	PCC	A-3	<b>7-0</b>	P-3	1.0	
List	Target(s)	8	A-3	C-3	_ P-3	1.0	
Note	Weapon ready	Weapon system	V-2	C-2	:	30.0**	
,			, ,			*Per target **Alignment and is par	Per target Alignment on target is automatic and is part of ready indication.
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		•		MUNCTION	Assess Damage		No. O4
(APPROXIMATE)			,	WETHOD V	Voice Data Recording	Ing	(Revised)
PERFORM	PERFORMANCE ELEMENTS	•	WOR	WORKLOAD COMPONENTS	S	DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S).	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPLENTS
Estimate	Percentage of target coverage	Sensor display	Visual search of terrain (V-6)	What per- centage? (C-7)	LOS Control (P-4)	7	Time for PE 1 and PE 2 total 12-16 seconds. The two PEs will be performed simultaneously during scan/survey of target area for 12-16 seconds.
Determine	Targets disabled		Visual inspection (V-6)	Destroyed, repairable, usable? (C-7)	LOS control (P-4)	٧.	Total time = 43-62 secs. Estimated by adding: .5 transition time to PE 1; 12-16 seconds for PE 1 and 2 transition
,					,		time to PE 3; 30-45 seconds for PE 3 43-62 seconds
Record	Message	Mission data device	A-3	7-0	P-3	30	***
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				FUNCTION	FUNCTION Check Aircraft Systems (Holding)	tems (Holdin	g) No. 05
TOTAL TIME 41-158 seconds (APPROXIMATE)	1-158 seconds	•	,	NETHOD			(Revised)
PERFORM	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	8	DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Check	Puel	Fuel system	Viaual symbolic mental calcula- tions (V-5)	Quantity (mission time) (C-6)		01	
Gheck K	Engine instru- ments	Propulaton system	Visual symbolic (V-5)	Within safe limits (C-2)	;	10	to PE
Check	Aircraft equipment	Life support	Visual inspection tion (V-6)	Arailable and operating (C-6)	İ	20	.5 transition to PE 3 -45 for PE 3 .5 transition to PE 4 3-15 for PE 4 .5 transition to PE 5
Check	Caution/ warning indicators	Malfunction detection display	Visual symbolic (V-1)	No indica- tions jeo- pardizing mission continua- tion (C-2)		m	y-45 for FE 5 5 transition to PE 6 8-20 for PE 6 41-158 seconds
Check	Cockpit		Visual inspec- tion (V-6)	Secure (C-6)	į	,	
Perform	Checklist	Checklist	Visual reading (V-7)	No condi- tions jec- pardizing mission continua- tion (C-6)		2	,

	TOTAL TIME (APPROXIMALE)				METHOD				(Revised)
-	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
•	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPLENTS	
	Check	Caution	Display FP	1-λ	C-2 necessary (C-1)		£		•
	51 Check	System Instruments	Engine and caution displays	Visual symbolic (V-5)	In limits? Desire setting (C-2)	•	10		
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				METHOD			
VERE	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS	S	DURATION (SECS)	
	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Select	Sensor(s)	Sensor subsystem	Visual inspect (V-6)	Sensor operating? (C-6)	Sensor switch (P-l)	1.5	Each PE occurs in sequence.
Adjust	Sensors	Sensor subsystem	Visual inspect (V-6)	Adjust- ments needed -brightness	Sensor controls fine adjust-	30	seconds.  Estimated by adding: .5 transition to PE 1
				-contrast -gain -polarity -frequency -boresight (C-6)	ments required (P-2)		1.1-1.3 for PE 1 .5 transition to PE 2 3-50 for PE 2 (May include: 2.2 secs focus 1.8 secs polarity change
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TOTAL TIME Not applicable	: applicable			METHOD Au	Automatic			(Revised)
(APPROALMATE)						MOTTAGIA		
PERFORMAN	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		(SECS)		
VFRB	OBJECT	SUBSYSTEM(S)	SENSORY	COCKITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
Note	Cueing symbol	Sight display	V-5	C-2		1.0	1	
Select	Indent mode	Acquisition system	A-3	<b>7-</b> 0	P-3	1.0	,	
Note	Ident symbol	Sight display	V-5	C-2		1.0		1
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TOTAL TIME 101 (APPROXIMATE)	101,9-137,1 seconds		,	FUNCTION CO	Coordinate Mission		No. 10
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	8	DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Select	Radio, security	Radio, security device	Vis symbol (V-5)	Correct_ radio? (C-3)	Switch activation (P-1)	, 10	Each PE Occurs in sequence.
Transmit	Message	Radio	Auditory, message content (A-3)	Encoding (C-4)	Switch activation (P-1)	54	seconds.  Estimated by adding: 5 transition to PE 1
Note	Acknowledgement	Radio	Auditory content (A-3)	Verify content established (C-4)		٠ •	.5 transition to PE 2 45-55 for PE 2 .5 transition to PF 3 .5 for PE 3
Coordinate	Mission number	Radio	Auditory, message content.	Message received? Authenti-	Switch activation (P-1)	45	orus seus usido amaiting PE 4 45-55 for PE 4
			(G- <b>V</b> )	correct? Mission proc? (C-5)		,	
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TOTAL TIME 76.	76,9-114.1 seconds	,		FUNCTION CC	Coordinate Target Selection	Selection	No. 11	
(APPROXIMATE)				METHOD				
PERFORMAL	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)		
 VERB	-OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
Select	Communication channels and security	Communication system	Visual sysbolic (V-5)	Adequacy of setting -equipment operating (C-3)	Selector switches (P-1)	.10	Each PE Occurs in sequence.  Total time = 76.9-114.1 seconds.	
Note	Target data	Communication system	Auditory (A-3)	Authentic message received (C-6)		30	Estimated by adding: .5 transition to PE 1 5.4-10.6 for PE 1 .5 transition to PE 2	
Record	Target data	DEK FCC	Visuel - symbolic (V-5)	Encoding (C-4)	Keyboard entries (P-7)	.01	.5 transition to PE 3 7-11 for PE 3 .5 transition to PE 4	
Transmit	Message (brief) Acknowledgement	Communication	Auditory (V-3)	Encoding recall (C-4)	Switches, (P-1)	<b>ا</b>	ro to	
Coordinate	Attack with other attack	Communication system	Auditory (A-3)	Target assignment Firing schedule (C-5)	Transmitter switches (P-1)	45.		

ا القال الله الله الله الله الله الله ال	1			,		FUNCTION De	Deploy to Cover	î	No. 12	
OBJECT   STRSCRY   COCGUING   PSYCHOMOTOR   CONTINUOUS   COMPONENTS   COCCURING   CONTINUOUS   COMPONENTS   COCCURING   COCC		6	-19.5 seconds			1			(Revised)	•
Obstacle					auca	STREET, COLOR OF STREET		NOTTAGIN		1 -
Obstacle Outside Visual Adequate 5 PE 1 occurs clearance Citearance Control (C-2) PE 2 occurs street of PE 2 occurs (C-2) And (C-2) PE 2 occurs of Control (C-1) And (C-2) PE 2 occurs occurs of Control (C-1) And (C-2) And (C-2) PE 2 occurs occ		PERFORMAN	WE ELEMENTS		WORK	LOAD COMPONENTS		(SECS)	•	
Obstacle Outside Visual Adequate 5 PE 1 occurs field (V-1) (C-2)		VERB		SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	+
Aircraft Outside visual Visual, Control Control 3  Aircraft Outside visual Visual, Control Switch 2-5  Aircraft Outside visual Visual, Control Switch 2-5  Altitude Outside visual Visual, Control Switch 2-5  Altitude Outside visual Visual, Clear? Control Signal Color Color Switch (9-1)  Altitude Outside visual Visual, Clear? Control Signal Color Switch Co		Check	Obstacle clearance	Outside visual field	Visual inspec- tion (V-1)	Adequate clearance (C-2)	•	<b>ن</b>	occurs of PE 3, and	
Aircraft Outside visual Visual, Control Switch 2-5 Estimated by adding:  field detect adjustment (P-1) .5.frantion to PE 1 .5.frantion to PE 2 .1.4 for PE 1 .1.4 field wisual visual, Clear? Control 5 for PE 2 .5. for PE 2 .5. for PE 2 .5. for PE 2 .5. for PE 2 .5. for PE 2 .5. for PE 3 .5. for PE 4 (No transition time assumed between PE (V-2) .5. for PE 3, and 4)		Establish	Dash	Flight control	Visual, relative movement (V-2)	Control adjustment needed? (C-1)	Control Pressure (P-4)	<b>.</b>	time estimate.  Total time = 5.1-19.5 seconds.	
Altitude field visual Visual, Clear? Control 5 2-5 for PE 4 (No translation time movement (P-4) (P-4) 3, and 4)		Stabilize (establish hover)	Aircraft	Outside visual field	Visual, detect movement (V-2)	Control adjustment needed? (C-1)	Switch (P-1)	2-5		
		Reduce	Altítude	Outside visual field	Visual, relative movement (V-2)	Clear? C-6)	Control -pressure (P-4)	٠ •	1	
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				FUNCTION De	Designate Target		No. 13
TOTAL TIME 24, (APPROXIMATE)	24.2-32 secords	,		METHOD		1	(Revised)
PERFORMAL	PERFORMANCE ELEMENTS	٠,	WOR	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Align	Sight	Sensor control (voice)	¥nd-3	C-3. (C-1)	p-3	2-5	Precedes PE 2. All PEs are sequential. Transfer the of Seconds
Select	Narrow FOV	Sensor controls	Aud-3	Target centered? (C-1)	P-3	1.0	estimated before start of each PE.
Arm	Laser designator	Laser controls	Vis symb (V-5)	I aser ready? (C-2)	Discrete activation (P-1)	ا ان (ر	Total time = 21.2-32 seconds. Estimaeted by adding:
Activate	Laser designator	Laser controls	Vis symb (V-5)	Target lased? (C-2)	Discrete activation (P-1)	10	2-5 for PE 1 5 transition to PE 2 9 for PE 5 5 transition to PE 7
Note	Weapon impact	Sensor display	Vis monitor (V-1)	Target hit? (C-2)	•	, M	for PE 3 transition to 2 for PE 4
De-Arm	Laser	Laser cont	Vis symb (V-5)	Laser safe? (C-2)	Discrete activation (P-1)	νį	2-5 for PE 5 .5 transition to PE 6 .2-5 for PE 6
							(Assumes single switch. And .7-1.0 for each additional switch) f transition to PF 7
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TOTAL TIME 7-	7-11 seconds			 종	Detect Aerial Ihreat	3t	NO. 14
(APPROXIMATE)				METHOD	Automatic Search, Cueing	Cueing	(Revised)
PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Survey	Airspace	Sensor display	Visual monitor (V-1)	Cueing symbol? (C-2)		20.	PE 1 time variable for period preceding PE 2
Detect	Cueing symbol	Sensor display	Visual symbolic (V-5)	Target cue? (C-3)		Ň	Estimated by adding: .5 transition to PE 2
Align	Sight reticle	Sensor controls (voice)	A-3	Target centered? (C-1)	P-3	2-5	.5 for PE 3
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			,	FUNCTION De	Detect Aerial Threat	at	Ko. 15
TOTAL TIME (APPROXIMATE)	R 5.8-28.5 seconds			METHOD	Unaided		
3d	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Survey	Airspace	Unaided	Visual survey (V-1)	Area clear? (C-6)		12.5	Survey airspace time variable for period preceding A/C detection.
Detect	Movement	Unaided V	Visual detect (V-2)	Signal (maneuver) (C-2)		2	provided to first discrete PE (2).
Direct	Sensor (to target)	Sensor controls A/C direction indicated	Visual align (V-4)	Approx bearing to sighting? (C-6)	Control pressure (P-4)	v	Estimated by adding: .3-3 for PE 2 .5 transition to PE 36 for PE 3
Identify	Threat	Visual, unaided	Visual; Movement Shape (V-2)	Orientation of A/C. Type of A/C. A/C. (C-4)	,	'n	3-20 for PE 4 No transition time from PE 3 to PE 4 (PE 4 time will vary depending on method
Ident1fy	Threat	Sensor display (visual)	Movement shape heat signature (V-2)	Level of threat Friend/ foe (C-4)		10	, ,
Identify	Threat	Sensor display (aural)	Tone(s) continuous or intermit- tent (A-3)	Type of threat A/C. Level of threat (C-4)		10	
				:			- ' ,
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				FUNCTION De	Detect Target (Ground)	(pun		No. 16
TOTAL TIME			•	١.	Automatic			(Revised)
(AFFRUALFALE)	.•		!	Ì				
PERFORMAN	PERFORMANCE ELEMENTS	,	WORK	WORKLOAD COMPONENTS		DURATION (SECS)		ı
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
Select	Search mode	Sensors	A-5	£-0	p-1	.5-		
Establish	Search pattern (zone)	Voice command system	A-3	7-O	P-3	3.0-	•	
Monitor	Display	Sensor display	V-1	c-2		v. cont.	,	
Note	Cueing symbols	sensor display	V-5	<b>C-</b> 2	1	1.0		
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				FUNCTION D	Detect Target		No. 17
TOTAL TIME 9- (APPROXIMALE)	9-14.8 seconds			METHOD	Prepoint, Auto Cueing	eing	(Revised)
PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	S	DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Ver <u>1</u> fy	Target data in FCC	FCC display	Visual symbol (V-5)	Data complete? (C-6)	: • <b>!</b>	w.	Each PE occurs in sequence. Total time = 9-14.8
Select	Sensor prepoint	Sensor voice contr.	Visual symbol (V-5)	Prepoint option (C-3)	P-3	1.1	seconds. Estimated by adding:
Detect	Cueing symbol	Sensor display	Visual symbol (V-5)	Signal recogni- tion (G-2)		'n	.5 transition to PE 1 .35 for PE 1 .5 transition to PE 2 1.1-1.3 for PE 2 5 transition to PE 3
24 Align	Sight	Sensor display (sight) ADS	Visual alignment (V-4)	Target centered? (C-2)	Control pressure (P-4)	'n	for PE 3 transition to PE for PE 4 .8 seconds
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MANCE ELPHENTS  MANCE ELPHENTS  OBJECT  SUBSYSTEM(S)  SENSORY  COCANITIVE  Obstacle  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Clearance  Flight controls  Visual  Course	TOTAL TIME 9.5	9.5-22.2 seconds			FUNCTION ES	Establish Position (Firing or Observation)	(Firing or (	bservation) No. 18 (Revised)
PERFORMANCE ELEMENTS  OBJECT  SUBSYSTEM(S)  SEMSORY  COCHITURE  OBJECT  OBJECT  SUBSYSTEM(S)  SEMSORY  COCHITURE  OBJECT  OBJECT  OBJECT  SEMSORY  COCHITURE  OBJECT	(AFFROALMALE)							
ain Obstacle Filight controls Visual Choose Filight Control clearance clearance (Visual Choose Control Choose control clearance clearance (Visual Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Control Choose Choose Choose Control Choose Choo	PERFORMAL	NCE ELEMENTS	٠	, wor	KLOAD COMPONENTS		DURATION (SECS)	
Course Flight controls Visual Gnose Citation control clearance (V-2) (G-2) pressures (V-2) (G-2) pressures (V-2) (G-2) pressures (V-2) (G-2) pressures (V-2) (G-2) pressures (V-2) pressures (	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Course Rayley Visual Course Control  Filght controls discrim addustment pressures  (V-5) (C-5)  Outside visual (Visual (C-4))  Obsizion map (V-5)  Clearance Clearance Clearance Mircraft Flight controls (V-1)  tt hover)  Marcraft Flight controls (V-1)  (V-2) (C-1)  (V-2) (C-1)  (V-2) (C-1)  (V-2) (C-1)  (V-2) (C-1)  (V-2) (C-1)	Maintain	Obstacle clearance	Flight controls	Visual scan (V-2)	Choose direction (C-2)	Flight control pressures (P-4)	21.5	pE 1 and PE 2 continuous throughout function, overlapping PE 3, 4, and 5. Time estimates
Position Outside visual Visual Decoding 10 5-5 transition to 5-5 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 3 7-11 for PE 4 7-11 for PE	Follow	Course	Nav display Flight controls	Visual discrim (V-5)	Course adjustment needed? (C-5)	Control pressures (P-4)	21.5	Total time = 9.5-22.5 seconds.
Obstacle Outside visual detect space, clearance clearance clearance detect space, clearance clearance (C-2)  Novement (C-2)  Aircraft Flight controls Visual detect needed?  (V-1)  Movement (C-1)  (V-2)	Check	Position	Outside visual map	Visual discrim (V-5)	-Decoding (C-4)		10	<b>8</b>
Aircraft Flight controls Visual Adjustments Outside visual detect necded? movement (C-1) (V-2)	Check	Obstacle clearance	Outside visual	Visual detect movement (V-1)	Adequate space, masking? (C-2)		- <del>,</del>	3 A
	Stabilize (Select hover)	Aircraft	Flight controls Outside visual	Visual detect movement (V-2)	Adjustments necded? (C-1)	Switch (P-1)		<i>:</i>
				<u></u>				
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					<b>100 100 100 100 100</b>			,

	-			FUNCTION	Estimate Range		No. 19
TOTAL TIME 5.7-10 seconds (APPROXIMATE)	7-10 seconds			METHOD	Automatic		(Revised)
PERFORMAN	PERFORMANCE ELEMENTS		MOM	WORKLOAD COMPONENTS	S	DURATION	
						(SECS)	,
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS CO	CONTENTS
Select	Range mode	Sensor control	V-5	3	P-1	1.0	
List	Targrt(s)	Sensor voice	A-3	C-3	P-3	2.0*	1
Activate	Laser range finder	Sensor control	V-5	C-1	P-1	1.0	
Note	Range(s)	FCC display, map display	V-5	7-5	; ;	2.0	,
						*Per target	per target
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TOTAL TIME 17 (APPROXIMATE)	17.9-37.9 seconds	•		METHOD	Unaided Estimation		
PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	S	DURATION (SECS)	
VERB	ORJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRFIE/ CONTINUOUS	COMMENTS
Align	Sight reticle	Sensor controls	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	\$	Each PE occurs in sequence.  Total time = 17.9-37.9
Change	FOV	Sensor controls	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	Estimated by adding: .5 transition to PE 1
Note	Igt/mil dimensions	Sensor display	Visual discrim (V-6)	Evaluate target dimension (C-6)	Sight control pressure (P-4)	, •	
Estimate	Range	1 2 1	:	Fstimation (C-7)	•	20	
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No. 21			COMMENTS	PE 1 continuous for a variable period prior to PE 2.	seconds.  Estimated by adding:	13-2 for PE 2 13-2 for PE 3 2-5 for PE 3 16-28 seconds	
·		DURATION (SECS)	DISCRETE/ CONTINUOUS	20	<b>5</b>	50	
Evaluate Position			PSYCHOMOTOR	Sensor controls (P-4)	Sensor controls (F-4)	Sensor controls (P-4)	
FUNCTION EV	METHOD	WORKLOAD COMPONENTS	COGNITIVE	Area safe? (C-6)	Clear 1.0S (C-6)	Adequate area FOV? (C-6)	
		WORK	SENSORY	Visual, movements, shapes (V-2)	Visual scene (V-2)	Visual inspec- tion (V-6)	
			SUBSYSTEM(S)	Sensors	Sensor controls	Sensors, maps	
	16-28 seconds	PERFORMANCE ELEMENTS	OBJECT	Surroundings	Sensor	Visual access	
	TOTAL TIME 16-2 (APPROXIMATE)	PERFORMAN	VERB	Survey	Slew	Check	

				FUNCTION F1	Fire Cannon		No. 22	
TOTAL TIME 8. (APPROXIMATE)	8.2-14.5 seconds		,	1			(Revised)	,
PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERR	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
ks:	Adjusted sight alignment	Sensor	Visual, symbolic (V-2)	Verify sight picture (C-2)		- 5	Decision to fire precedes this function.	
Activate	Gun trigger	Weapon system		Trigger position. recognize (C-2)	Switch activation (P-1)	ហ្វ.	~ % =	
Observe	Tracers, impact	Sensor sight	Visual trace (V-3)	On target (C-2)		vo .	Seconds. Assumes single switch in PE 5.  Estimated by adding:	
Adjust	Alignment	Sensor sight	Visual align (V-4)	Adjustment needed (C-3)	P-1	3.5	2-3.5 for PE 1 and 2 .5 transition to PE 3 2-5 for PE 3	·
De-arm	Gun	Weapon system	Visual, symbolic (V-2)	Gun secured (C-2)	Switch or switch sequence (P-1)	٠,	2-3.5 for PE 4 .5 transition to PE 5 .25 for each switch in PE 5 8.2-14.5 seconds	
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and a second		•	,	ξ.	rire weapon		,	(n - 1)
(APPROXIMATE)			,	METHOD	Automatiac		,	(Revised)
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
Select	FCC	Voice command/ data control panel	٧-5	c-3	P-1.	1.0	,	
Select	Weapon type(s)	FCC (voice control)	A-3	7-0	ф-3	1.0- vari- able		
Select	Control mode Veapon	FCC (voice control)	A-3	C-3	P-3	1.0	,	
List	Target(s)	FCC (voice control)	A-3	C-3	P-3	1.0**		
Release	Weapon(s)	Armament trigger switch		C-1	P-1	3.03		
			,			**Per weapon type **Per target ***Add 3.0 seconds	weapon type target 3.0 seconds per target	ırget
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				FUNCTION	Handoff Targe. La	Laser Cueing	No. 24
TOTAL TIME	19-38 seconds			1			
			i				
PERI	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS	S	DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY -	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Transmit	Message alert	- Radio	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	'n	Each PE occurs in sequence.  Total time = 19-38
Note	Ack/ready	Radio	Auditory. Interpret (A-3)	Decoding (C-4)	:	<b>ب</b>	Estimated by adding: .5 transition to PE 1
Transmit	Message (brief) Alert for sensor cue	Radio	Auditory. Speech feedback (A-3)	Encoding (C-4)	-Switch activation Speech (P-1, P-3)	; <b>n</b>	transition for PE 2 transition for PE 3
Align	Sight	Sensor subsystem	Visual align (V-4)	Adjustment needed (C-1)	Control pressure (C-4)	'n	
Activate	Laser designator	Sensor subsystem	Visual detect (V-2)	Signal recognition (C-2)	Switch activation (C-1)	10	for PE 6 8 seconds
Note	Ack/tgt detected	Radio	Auditory interpret (A-3)	Decoding (C-4)	<u> </u>	ر.	
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TOTAL TIME Not				FUNCTION	Hover Masked			No. 25
(APPROXIMATE)	(APPROXIMATE)			METHOD	Automatic			(Revised)
	PERFORMANCE ELEMENTS	,	WOR	WCRKLOAD COMPONENTS	S	DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
Establish	Position desired	Outside visual field flight controls	V-1	C-2	7-d	10.0	,	
Select	Hover hold	Flight controls	1	.C-1	P-1	1.0		
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TOTAL TIME (APPROXIMALE)		,		METHOD AN	Identity Target Automatic		Revised)	
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONE TES		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS COMPENTS	NTS	
Select	Ident mode	Sensor control	S-V	C-3	P-1	1.0	,	
List	Target(s)	Sensor control (voice)	V-5 A-3	C-3	P-3	1.0*		·
Activate	Ident scan	Sensor control	V-5	C-3	P-2	1.0	,	
•			•			*Per target		
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TOTAL TIME Not applicable (APPROXIMATE)  PERFORMANCE ELEMENTS  VERB  OBJECT	licable						:
				METHOD	Automatic		(Revised)
			Aug.	STREET CONTOC CASO F		I DITRATTON	
	TEMENTS		WORK	WORKLOAD CURPONENTS		(SECS)	
	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS
Select W10	Wide FOV	Sensor	Visual monitor (V-1)	Adjustment needed? (C-1)	Switch activation (P-1)	1.0	PE 2 continuous during this function. Time estimate for PE 2 coincides with estimate
Align	Sight	Sensor control	V-4	C-1	P-4		for total function.
Select	Auto track	Sensor contr.	:	C-1 (C-3)	P-1		
145 Regain LOS		Sensor control AC	Visual ain (V-4)	Planning search (C-5)	Control pressure (P-4)	٧.	
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	TOTAL TIME Not applicable (APPROXIMATE)	t applicable			METHOD	Natilitatii Jepatattoli berecii hiterati		
	PERFORMAL	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
. •	Monitor	A/C movement	Outside visual; sensor subsystem	Visual, detect movement (V-2)	Verity relative position (C-2)		15	Time estimate for PE 1 overlaps continuous PE 2.
	Maintain	Separation	Flight controls; outside visual; sensor subsystem	Visual, detect relative movement (V-2)	Adjustments _needed (C-1)	-Control pressure (P-4)	07	mission requirements.  Total time not estimated.
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				FUNCTION Ma	Maneuver NOE		No. 29.
TOTAL TIME Not applicable (APPROXIMATE)	t applicable			METHOD			
PERFORMAI	PERFORMANCE ELEMENTS		KORK	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Maintain	Obstacle clearance	Outside visual flight controls	Visual detect (V-2)	Verify clearance (C-2)	Control pressures (P-4)	80	Total function time will vary depending on mission requirements.
Adjust	Flight modes	Outside visual	Visual detect movement (V·2)	Select appropriate filght modes (C-3)	Control pressures (P-4)	08	continuous during entire function. Overlapping discrete PE 2, 4, and 5. PE 2, 4, and 5 are
Check	Position	Outside visual navigation display	Visual symbol (V-5)	Decoding (C-4)		10	repeated throughout function Toral function time
Select	Flight path	Outside visual navigation display	Visual symbol (V-5)	Selection (C-3)	1	m	not estimated.
Follow	Course	Outside visual navigation display	Visual symbol (V-5)	Anticipating directional adjustments (C-5)	Control pressures (P-4)	08	

		,		FUNCTION Ma	FUNCTION Mask Aircraft, Lateral	eral	١	No. 30
TOTAL TIME			,	METHOD	Automatic		,	(Revised)
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		-
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	·
Check	Obstacle clearance (lateral)	Outside visual fielo	Visual inspection (V-1)	Adequate clearance (C-2)	•	. 2		
Establish	Drift	Flight controls	Visual, relative movement (V-2)	Control adjust needed (C-1)	Control pressures (P-4)	2-5		
Select	Hover hold	Flight controls		C-1	P-1	1.0		
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				FUNCTION Ma	Mask Afrcraft, Vertical	rical		No. 31
TOTAL TIME (APPROXIMATE)				METHOD	Automatic			(Revised)
PERFORMA	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS	,	DURATION (SECS)	,	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
Check	Obstacle clearance (lateral and vertical)	Outside visual field	Visual inspect clearance (V-1)	Verify descent path clear (G-2)	<b>l</b> i	· w		,
Reduce	Altitude	Flight controls	Visual relative movement (V-2)	Control adjustment needed (C-1)	Control pressures (P-4)	. <b>v</b> n		
Select	Hover hold	Flight controls		C-1	P-1	1.0	,	
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				FUNCTION MC	Monitor Terrain, Aerial Approaches	erfal Approac	hes	No. 32
TOTAL TIME (APPROXIMATE)			٠,	METHOD	Automatic			(Revised)
PERFORMAI	PERFORMANCE ELEMENTS		MOR	WORKLOAD COMPONENTS	S	DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPENTS	
Select	Sensor control	Voice command/ data control panel	۷-5	C-3	P-1	1.0		
Select	Search mode,	Sensor control (voice)	A-3	<b>7-</b> 0	P-3	10- 15.0		
Monitor	Sensor display	Sensor display	V-1	C-2		Cont vari- able		
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No. 33			COMMENTS	Total time = 3.5-5.5 seconds. Estimated by adding: .5 transition to PE 1
ning Displays		DURATION (SECS)	CONTINUOUS	vo .
FUNCTION Monitor Threat Warming Displays			PSYCHOMOTOR	
FUNCTION MOI	- Contrary	WORKLOAD COMPONENTS	COGNITIVE	Signal recognition (C-2)
		WORK	SENSORY	Auditory, visual, signal detection (V-2) (A-2)
		,	SUBSYSTEM(S)	Threat displays
3.5-5.5 seconds	,	PERFORMANCE ELEMENTS	OBJECT	Threat displays
TOTAL TIME 3.5-	(APPROXIMATE)	PERFORMAN	VERB	Monitor
TOTAL	(APPR		VERB	Monitor

	TOTAL TIME NOT (APPROXIMATE)	Not applicable		,	FUNCTION PE	Perform Evasive Maneuvers	neuvers	No. 35
	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	, ,
'	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
	Perform	Hard turns	Flight controls	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	30	All PEs overlap in an evasive maneuver Senario. Total time
,	Change	Altitude sharply	Fiight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	21	mission requirements. PE 1, 2, and 3 will be
	Change	Airspeed	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	. 4	for duration of functions.
<del></del>					,			Time estimates for each PE are for a single iteration and range from time estimated to
								initiate PE to an estimate of time PE will cintinue.
		•						No total time estimate.
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	٠			FUNCTION	Prepare Report			No. 35
TOTAL TIME (APPROXIMATE)					Voice Interactive Data Processing	Data Processi	8u	(Revised)
PERFORMAL	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS	S	DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
Select	Mission data recorder	Voice command/ data control panel	۷-5	C-3	P-1	1.0		,
Select	Format	Mission data display cont	A-3	<b>7-</b> 0	P-3	1.0	1	
Dictate	Report contents	Mission data recorder	A-3	<b>7-</b> 0	P-3	Varí- able	1	
Select	Review/ playback	Mission data recorder	V-5	C-3	P-1	1.0		
Review/Edit	Report	Mission data recorder	A-3 V-5	9-0	*	Vari- able	1	
Address	Report	Mission data recorder	A-3	<b>7-0</b>	P-3	3.0.4		
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		,	1	,				

VERB OBJECT Select Weapon Check Weapon status	SUBSYSTEM(S) Weapon arming panel Weapon control display	SENSORY Visual symbolic (V-2) Visual symbolic (V-2)	WORKLOAD COMPONENTS  COGNITIVE  Selection (C-3)  Verify (C-2)	PSYCHOMOTOR Switch activation (P-1)	DURATION (SECS) DISCRETE/ CONTINUOUS 5	1
		SENSORY Visual Symbolic (V-2) Visual Symbolic (V-2)	COCNITIVE Selection (C-3) Verify (C-2)	PSYCHOMOTOR Switch activation (P-1)	DISCRETE/ S 1	Each PE occur sequence.  Total time = seconds.  Estimated by
		Visual symbolic (V-2) Visual symbolic (V-2)	Selection (C-3) Verify (C-2)	Switch activation (P-1)	2	Each PE occurs in sequence.  Total time = 4.5-8 seconds.  Estimated by adding:
		Visual symbolic (V-2)	Verify (G-2)		н .	seconds.  Estimated by adding:
						The second secon
					,	3-6 for PE 1 .5 transition to PE 2 .5-1 for PE 2 4.5-8 seconds
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	F-8 SMTT TATAT	8-14 5 seconds			ا ≊	Prepare Weapon, Laser-Guided	ser-Gulded	No. 37
	(APPROX DAATE)				METHOD			
:		PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	SJ	DURATION (SECS)	
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
	Select	Weapon	Weapon arming panel	Visual symbolic (V-5)	Selection (C-3)	Switch activa- tion (P-1)	<u> </u>	Each PE occurs in sequence. Total time = 8-14.5
	Select	Laser code	Weapon arming panel	Visual symbolic (V-5)	Enter code (C-4)	Control switches (P-1)	, S	Estimated by adding: .5 transition to PE 1
	Check	Weapon status	Display	Visual symbolic (P-5)	Verify (C-2)	ļ	F4 ,	L
						,		8-14.5 seconds
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		,		PUNCTION Re	Receive Handoff		No. 38
TOTAL TIME 19. (APPROXIMALE)	19.5-39.5 seconds			METHOD	Laser Cueing, Automatic	matic	(Revised)
PERFORMAL	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	8	DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Note	Message alert	Radio	Auditory interp (A-3)	Decoding (C-4)		<b>5</b> 0	Each PE occurs in sequence.
Transmit	Ack/ready	Radio	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	'n	Estimated by adding: .5 transition to PE 1
Select	Laser cue	Sensor contr	V-2	C-3	<b>1-4</b>	5.0	
Note	Alert (lasing)	Radio	Auditory interp (A-3)	Decoding (C-4)	:	2-5	for PE 3 transition to PE for PE 4
Detect	Cueing symbol	Sensor	Visual detect (V-2)	Signal recog (C-2)	:	<b>S</b>	
Transmit	Ack (target detected)	Radio	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	<b>v</b> .	
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1 1 2		10-21 seconds			METHOD D1	Digital		
1 1 2	(APPROXIMATE)		**		1	8		
<u>                                     </u>	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	,	DURATION (SECS)	
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
1 2	Note	Message alert	Message device	Auditory detect Visual symbol (A-1) (V-5)	Signal recognition (C-2)		- 2	Each PE occurs in sequence with a 3-5 second delay between PE 2 and 3.  Total time = 10-21 seconds.
41	Send	Message (ack/ready)	Message device	Visual symbol auditory symbol (V-5)	Response select. (C-3)	Switch activation (P-1)	νį.	Estimated by adding: .5 transition to PE 1 .5 for PE 1 .5 transition to PE 2 .5 for PE 2 .5 for PE 2 .5 for delay-message
<b>.</b>	Note	"Splash" signal	Message device	Visual symbol auditory signal	Signal recognition (C-2)		2	transition time prior to PE 3 2-5 for PE 3 10-21 seconds
·		:.		(V-5) (A-1)				
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					FUNCTION R	Receive Message, Standard	tandard	No. 40
ATOTA (APP.)	(APPROXIMATE)	23-47 seconds		1	METHOD	Digital	,	(Revised)
	PERFORMAN	PERFORMANCE ELEMENTS		WORE	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	,	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Note		Message alert	Message display	Visual symbol auditory signal (V-2)	Signal recog (C-2)		2	Each PE occurs in sequence. Total time = 23-47 seconds.
Send	,	Messa{e (ack/ready.)	Message device controls	Visual symbol auditory signal (V-5)	Response select (C-3)	Switch activation (P-1)	ņ	Estimated by adding: .5 transition to PE 1 .5 transition to PE 2 .5 for PE 1 .5 transition to PE 2 .5 for PE 2 .5 transition to PE 3 .5 transition to PE 3 .5 transition to PE 3 .5 transition to PE 4
Note	,	Message content	Message display voice playback	A-3	Decoding (C-4)	Switch activation (P-1)	25	3
Send	,	Message (ack/roger)	Message device controls	Visual symbol auditory signal (V-5)	Response select (C-3)	Switch activation (P-1)	Ŋ	
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				1	o) occording	1		NO. 41
	: (			FUNCTION	Receive message (Stalluatu)	railogi a/		
TOTAL TIME 30.5-58.5 seconds (APPROXIMATE)	5-58.5 seconds			METHOD Re	Radio, Voice, Automatic	matic		(Revised)
PERFORMAL	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS).		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/	COMMENTS	
Note	Message alert	Communication system	Auditory interp (A-3)	Decoding (C-4)		<u> </u>		'
Select	Record, radio	Voice command/ data control panel	V-2	C-3	r-q	2.0		
Transmit	Message (brief) acl:/ready	Communication system	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	'n	,	
Note	Message	Communication system	Auditory interp (A-3)	Decoding (C-4)		25		
Transmit -	Message (brief) ack/roger	Communication	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activator (P-1, P-3)	,,		,
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			,	FUNCTION R	FUNCTION Record Target Data	8		No. 42
TUTAL TIME			,	METHOD	Automatic			(Revised)
(management)								
PERFORMAN	PERFORMANCE ELEMENTS	,	WOR	WORKLOAP COMPONENTS	S	DURATION (SECS)	•	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	- 1	COMMENTS	
Select	Target location mode	Sensor contr	V-5	£-0	P-1	5.0		
List	Target(s)	Sensor control (voice)	A-3	C-3	P-3	5.0- vari- able*		·
Activate	Laser range finder	Sensor control	V-5	C-1	P-1	1.0		
Note	Date	Mission data display	V-5	<b>4</b> 0		5.0. variable	•	
Activate	Recorder	Mission data control	V-5	· C-3	P-1	1.0		
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				FUNCTION Re	Respond to Threat Warning Signal	Warning Sign	al	No. 43
TOTAL TIME Not applicable (APPROXIMATE)	t applicable	÷		METHOD	Automátic			(Revised)
PERFORMAL	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS	8	DURATION (SECS)		,
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
Note	Alert	Display	V-2 A-3	C-2		1.0	,	*****
Note	Direction of threat	Display	A-3	ý-0	; ;	1.0		

PERFORMANCE ELPHENTS   NORALLAND COMPONENTS   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1998)   DURATION (1999)   DURATION (1999)   DURATION (1999)   DURATION (1994)					FUNCTION SE	Stabilize Aircraft	,	No. 44
PERFORMANCE ELEMENTS	TOTAL TIM (APPROXIM	E Not applicable			METHOD		,	
Object   Subscribe(s)   Strictory   Strictory   Discribe(s)   Strictory   Discribe(s)   Object   Strictory   Object   Strictory   Object   Objec	PE	RFORMANCE ELEMENTS	٠	WOR	KLOAD COMPONENTS		DURATION (SECS)	
Altitude Flight controls Detect S-R Control S-R Control Drift Flight controls Detect (V-2) Control S-R	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Defife Plight controls Detect S-R Control S-R Control Detect S-R Control Detect yav (C-1) Pressures (V-2)  Heading Flight controls (V-2) (C-1) Pressures (V-2) (C-1) Pressures (V-2) (C-1) Pressures (V-2) (C-1) Pressures (V-2) (C-1) Pressures (V-1) (C-2) (C-2) Pressures (V-1) (C-2)	Control	Altitude	Flight controls	Detect vertical movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	Time for PE 1, 2, and 3 will be variable depending upon mission.
Heading Flight controls Detect yaw S-R Control (V-2) (V-2) Pressures (V-2) (C-1) Pressures (P-4) (Dostacle Outside visual Visual Clear (P-4) (C-2) (V-1) (C-2)	Control	Drift	Flight controls	Detect horizontal movement (V-2)	S-R (C-1)	Control -pressures (P-4)	<b>'</b>	for function.
Obstacle Outside visual Visual Verify clear monitor (V-1) (C-2)	Control	Heading	Fiight controls	Detect yaw (V-2)	S-R (C-1)	Control pressures (P-4)	'n	
	Check	Obstacle clearance	Outside visual field	Visual monitor (V-1)	Verify clear (C-2)		<b>ທ</b> .	
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TS (SECS)  SWITCH SWITCH  SWITCH  CONTINUOUS  SWITCH  CONTINUOUS  (P-1)  Keyboard  (P-1)  Keyboard  1.5   25					PINCTION Su	Survey Target Area		No. 45
PERFORMANCE FLEMENTS  SUBSYSTEM(S) SENSORY  Auto search Auto search Auto search Sensor system Symbol Coverage area  Display Sensor display  Visual Sensor display  Visual Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Sensor display Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Coverage Symbol Symbol Coverage Symbol Coverag	TOTAL TIME NO	t applicable		r	METHOD AV	tomatic Search		(Revised)
PERFORMANCE PLEMENTS	(APPROXIMATE)				1			
Auto search Sensor system Visual Selection Switch Continuous (C-3) (C-3) (P-1)	PERFORMAL	NCE ELEMENTS	ı	WOR	KLOAD COMPONENTS		DURATION (SECS)	,
Auto search Sensor system Visual Selection Switch 1.5 symbol (G-3) (G-3) (G-1)	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPENTS
Search pattern, Sensor system Visual Encoding Keyboard 1.5 coverage area symbol (C-4) (V-5) (V-5) (V-7)  T Display Sensor display Visual Signal recognition (V-5) (C-2)	Select	Auto search	Sensor system	Visual symbol (V-5)	Selection (C-3)	Switch activation (P-1)	1.5	PE 1 and 2 occur in sequence prio to PE 3.
Display Sensor display Wisual Signal 25 2 estimated by adding 2 2 estimated by adding 2	Select	Search pattern, coverage area	Sensor system	Visual symbol (V-5)	Encoding (C-4)	Keyboard entries (P-7)	1.5	varies with mission requirements for search.
•	Monitor	Display	Sensor display	Visual survey (V-5)	Signal recognition (C-2)		- 25	2 estimated by adding: .5 transition to PE 1 1.7 for PE 1 .5 transition to PE 2
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TOTAL TIME Not applicable (APPROXIMATE)	ot applicable			FUNCTION SU	Survey Target Ar.a Manual Control, Visual Search	sual Search	No. 46
PERFORMA	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Slew	Sensor	Sensor controls	Visual track - _(V-3)	Select rate, directions (C-3)	Control pressures (P-4)	5	PE 1 time overlaps with PE 2.
Monitor	Display	Sensor display	Visual survey (V-5)	Sign, recognition (C-2)	Control pressures (P-4)	- 25	PE 2 time variable depending upon mission requirements.
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	TOTAL TIME Not applicable	t applicable			FUNCTION Su	Survey Waypoint		No. 47
	(APPROXIMALE)				-			
-	PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
	VERB	OBJECT	SUBSYSTEM(S).	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
,	Approach	Waypoint	Navigation	Visual symbolic (V-5)	Further move- ment needed? (C-5)		30	PE 1 continuous. Time varies with mission requirements.
<del></del>	Verify	Position	Map, outside visual	Visual symbolic visual survey	Evaluative (C-6)	Map orienta- tion (P-5)	10	No total time estimate for function.
,	4			(V-5, V-1)		1		
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TOTAL TIME NO.	Not applicable		•	FUNCTION Track Target METHOD	ack Target	. '	No. 48
PERFORMAL	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS	-	DUR.TION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Align	Sight reticle	Sensor sight	Visual align (V-4)	Slew rate (C-1)	Control pressures (P-4)	5	PE 2 is continuous throughout function. Function duration will warm with mission
Track	Target	Sensor controls	Visual align (V-4)	Slew rate (C-3)	Control pressure (P-4)	45	requirements. No time estimate for total function.
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		COMMENTS	Each PE occurs in sequence.  Total time = 5-10 seconds.	Estimated by adding: .5 cransition to P: 1 .2-4 for PE 1 .5 transition: to PE 2 .5 for PE 2 .5-10 seconds	
	DURATION (SECS)	DISCRETE/ CONTINUOUS			
		- 8	10		1
Voice, Brief	- 1	PSYCHOMOTOR	Switch activation (P-1) Speech		
METHOD	WORKLOAD COMPONENTS	COGNITIVE	Correct channel? (C-3)	(C-4)	
	WORK	SENSORY	Visual symbolic (V-5) Auditory	(A-1)	
		SUBSYSTEM(S)	Radio Radio		
5-10 seconds	PERFORMANCE ELEMENTS	OBJECT	Comm. channel		
TOTAL TIME 5-10 (APPROXIMATE)	PERFORMANC	VERB	Select Transmit		

(APPROXIMATE)  PERFORMANCE ELEMENTS  VERB  VERB  OBJECT  Select  Comm channel  Ressage alert  Note  Ack/ready  Note  Note  Ack  Ack  Ack	SUBSYSTEM(S)	,	METHOD	Voice		(Revised)
PERFORMANCE ELEMENTS  OBJECT  Comm channel  Message alert  Ack/ready  Ack/ready  Ack/	SUBSYSTEM(S)					
PEKENKANCE ELEMENTS  OBJECT  Comm channel  Message alert  Ack/ready  Ack/ready  Ack/ready	SUBSYSTEM(S)	Agort .	STRUCTACO CAO 174001		I DITEATTON	
object Comm channel Message alert Ack/ready Ack/ready Ack	SUBSYSTEM(S)	WOKA	LOAD CONFORMA		(SECS)	
mit Message alert Ack/ready Message Ack		SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
mit Message alert Ack/ready Message Ack	Communication system	۷-5	6-3	P-1		Each PE occurs in sequence.
Ack/ready Message Ack	Communication system	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	ν,	Total time = 23-37 seconds.  Estimated by adding:
mit Message Ack	Communication system	Auditory interp (A-3)	Decoding (C-4)	•	<b>v</b> n	
Ack	Communication system	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	50	
	Communication system	Auditory interp (A-3)	Decoding (C-4)		in .	
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					FUNCTION IN	Transmit Report		No. 51	
	TOTAL TIME 8.7 (APPROXIMATE)	8.7-17.7 seconds				Digital			
	PERFORMA	PERFORMANCE ELEIGNIS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)		. —
,	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
	Send .	Message alert, ident code	Message device	Visual symbol (V-5) (A-1)	Message sent? (C-3)	Button (P-1)	5.	Each PE occurs in sequence.  Total time = 8.7-17.7	······································
	Note	Acknowledgement, authentication code	Message display	Visual symbol auditory signal (V-5)	Authentic reply? (C-6)			Estimated by adding: .5 transition to PE 1 2-5 for PE 1 .5 transition to PE 2 .5 transition to PE 2 .5 for PE 2	
	Send	Message	Message device	Visual symbol auditory signal (V-5)	Message sent (C-2)	Switch activation (P-1)	ņ	S S S	
	Note	Acknowledgement, authentication code	Message display	Visual symbol auditory signal (V-5)	Authentic reply? (C-6)		8		<u> </u>
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				FUNCTION Un	Unmask Aircraft. Lateral	ateral	-No. 52
TOTAL TIME (APPROXIMATE)				METHOD	Automatic		(Revised)
PERFORMAL	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	8	DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Check	Lateral clearance	Outside visual field	Visual inspect (V-1)	Adequate clearance? (C-2)		- 2	1
Establish	Drift	Outside visual field	Visual monitor, relative movement (V-2)	S-R (C-1)	Control pressures (P-4)	w "	
Select	Hover hold	Flight controls		C-1	P-1	1.0	
Check	Weapon path clear	Outside visual field	Visual orient (V-4)	Verify weapon path clear (C=2)			
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				FUNCTION Un	Unmask Aircraft, Vertical	ertical	No.	No. 53
TOTAL TIME Not applicable (APPROXIMATE)	t applicable			, ,	Automatic		(Re	(Revised)
PERFORMA	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)		-
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
Increase	Altítude	Flight controls sensors visual field	Visual, check visual field (V-2)	Verify LOS target clear (C-2)	Fiight control pressures (P-4)	10		
Gheck	Weapon path clear	Surrounding visual field	Visual orientarition (V-4)	Verify clear of obstacles (G-2)		,		
Select	Hover hold	Flight cont	! !	C-1	P-1	1.0		
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				FUNCTION Un	Unmask Sensor	٠		No. 54
TOTAL TIME (APPROXIMATE)				METHOD	,			(Revised)
PERFORMAI	PERFORMANCE ELEMENTS		MORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
Increase	Altitude	Flight controls	Visual letect movement (V-2)	Adjustments necessary (C-2)	Control pressures (P-4)	10	,	
Check	Sensor LOS	Sensor display, controls	Visual survey (V-1)	Verify clear (C-2)	Control pressures (P-4)	, '		
Select	Hover hold	Flight controls		C-1	P-1	1.0		
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				1	FUNCTION	Update Doppler		No. 55	
	TOTAL TIME 1 (APPROXIMATE)	12.8-26.2 seconds			METHOD	Remote Landmark		***************************************	
	PERFORM	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS	8	DURATION (SECS)		
4	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
,	Identify	Waypoint	Outside visual, map	Visual discrimi- nation (V-6)	Confirm location (C-6)	Orient map (P-5)	5	Each PE occurs in sequence. PE 3 time varies with	
•	Select	Update mode, preset waypoint	Doppler controls	Visual symbolic (V-5)	Recall position number (C-4)	Discrete adjustment (P-2)	0.0	To fly over landmark.  Total fime = 8.4-17.8 seconds plus maneuver	
1	Overfly	Landmark	Flight controls outside visual field	Visual track (V-3)	Select heading (C-3)	,	<b>'</b>	dding: to PE	
,	Activate	Update switch	Doppler controls	Visual symbolic (V-5)	Verify over landmark - (C-2)	Switch activation (P-1)	1	.5 transition to PE 2 .79 for PE 2 .5 transition to PE 4 .5 transition to PE 4	
1	Select	Navigation mode, next waypoint	Doppler controls	Visual symbolic (V-5)	Recall waypoint desired (C-4)	Discrete adjustment (P-2)	٠,	./-1.4 IOL FE 4 .5 transition to PE 5 4-7 for PE 5 8.4-17.8 seconds	
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		•		FUNCTION UP	Update Doppler		No. 56
TOTAL TIME (APPROXIMATE)	23 seconds			METHOD	Remote Landmark		
PERFOR	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
Identify	Lendmark	Outside visual field, sensor, map	Visual discrim (V-6)	Confirm landmark (C-6)	Orient map (P-5)	'n	Each PE occurs in sequence.
Select	Preset coordi- nates	Doppler	Visual symbolic (V-5)	Recall post- tion number (C-4)	Discrete adjustment (P-2)	1.0	seconds.  Estimated by adding:
Select	Remote update doppler	Doppler controls	Visual symbolic (V-5)	Recall post- tion number (C-4)	Switch activation (P-1)	1.0	
Align	Sight on landmark	Sensor system	Visual alignment (V-4)	Verify land- mark centered (C-2)	Control Pressures (P-4)	. 4	. E E
Activate	Range finder	Laser range finder	Visual Align (V-4)	Verify feature lased (C-2)	Switch activation (P-1)	1.0	.5 transition to PE 6 .7-1.4 for PE 6 .5 transition to PE 7 4-7 for PE 7 17 # 75 2 econds
Activate	Update (remote)	Doppler nav controls	Visual symbolic (V-5)	Verify update (C-2) (C-4)	Switch activation (P-1)	1.0	
Select	Nav mode, next waypoint	Doppler nav controls	Visual symbolic (V-5)	Recall way- point desired (C-4)	- Discrete adjustment (P-2)	<b>s</b>	
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					FUNCTION ES	Estimate Adjustments	ts.	No. 57	ı
	IOTAL IME 12,1-22,3 seconds (APPROXIMATE)	L-22,3 seconds	,	•	METHOD	Automatic			
	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	,	
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR.	DISCRETE/	COMMENTS	
	Select	Wide FOV	Sensor	Visual alignment (V-4)	Adjustment needed (C-1)	Switch activation (P-1)	1.0	Each PE occurs in sequence.	·
	Note	Impact point	Sensor	Visual detect (V-2)	Verify impact (C-3)		٠,	seconds. Estimated by adding:	
,	Align	Sight on impact point	Sensor	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	ν,		
	Select	Narrow FOV	Sensor	Visual alignment (V-4)	Adjustment needed (C-1)	Switch activation (P-1)	1.0	for PE 3 transition to PE for PE 4 transition to PE for PE 4	
	Align	Sight on impact point	Sensor	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	<u>.</u>	for PE 5 transi-lon *> PE 5 for PE fransition to PE	
,	Activate	Laser range finder	Laser range finder	Visual alignment (V-4)	Verify laser on spot (C-3)	Switch activation (P-1)	1.5	5 for PE 7 -22.3 seconds	
	Note	Impact coordinates	Sensor display	Visual symbolic (V-5)	Decoding (C-4)		ر د آ	<b>↓</b>	<del> </del>
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PERPONANCE LIDERINS   WORSTAND CONTONERTS   UNGLINE					FUNCTION En	Engagement, Air-to-Air	-Air	No. 58
PERFORMANCE ELEMENTS  OBJECT	TOTAL TIME NO (APPROXIMATE)	t applicable			. 1	stablish Attack R	un	
Outside Visual   Visual   Control	PERFORMAL	NCE ELEMENTS		WORK	CLOAD COMPONENTS	8	DURATION (SECS)	
Atrack run Outside visual direction closure (P-4) Control amount of healing and pressures (P-4) (C-3) (P-4)	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOU	
Intercept Outside visual relative pressures control true varies and evasive counter true movement (C-3) and stance to be flown and counter actack maneurs flow and counter actack maneurs flow by the enany altrasft (P-4) by the enany altrasft (P-4) by the enany altrasft (P-4) by the enany altrasft (P-2) and altrasft maneurs flow and and evasive counter flow and and evasive counter.  Airspeed Flight Visual Check an extram flinium time of provided instruments symbolic alrapsed (C-3) (C	Establish	Attack run	Outside visual flight controls	Visual, direction (V-4)	Establish closure course (C-3)	Control pressures (P-4)	- 50	PE 1 time varies with amount of heading and power charge required.
Airspeed Flight Visual, Check 1 FL, and Jithes maximum instruments (V-2) (V-2) (C-3) (	Fly	Intercept headings	Outside visual flight controls	Visual, rela- tive movement (V-k)	Stop relative movement (C-3)	Control pressures (P-4)	50	PE 2 time varies with distance to be flown and evasive counterattack maneuvers flown by the enumy aircraft.
minimum tine for minimum tine for ransition to PE minimum for PE 3 seconds	Monitor	Airspeed	Fiight instruments	Visual, symbolic (V-2)	Check maximum airspeed (C-3)	1	<b>-</b>	PE 1, 2, and 3 times may overlap. No total time is estimated, but minimum time estimated by adding
. 5 transition to PE . 5-1 minimum for PE . 77.5 seconds							٠.	rrans: fon to PE minimum time for
						, ,	·	.5 transition to PE 3 .5-1 minimum for PE 3 7.5 seconds
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#### APPENDIX

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SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS
(REVISED TO REFLECT AUTOMATION OF SELECTED SUBSYSTEMS)

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FUN	NCTION NO:	FUNCTION
	01	Acquire Position Data, Automatic
	02	Acquire Position Data, Shift From Known Point
	03	Align Heading on Target Bearing
	04	Assess Damage
	05	Check Aircraft Systems (Holding)
1	06	-Check A/C Systems (Power Change)
	07	Check Course Required
	08	Check Sensor Operation
	09	Check Sights
	10	Coordinate Mission
	11	Coordinate Target Selection
	12 .	Deploy to Cover
	13	Designate Target
	14	Detect Aerial Threat, Automatic Search, Cueing
	15	Detect Aerial Threat, Unaided
	16	Detect Target (Ground), Free Search
	17	Detect Target, Prepoint, Auto Cueing
	18	Establish Position (Firing or Observation
	19	Estimate Range, Automatic
	20	Estimate Range, Unaided Estimation
	21	Evaluate Position
	22	Fire Cannon
	23	Fire Weapon
	24	Handoff Target, Laser Cueing
	25	Hover Masked
	26	Identify Target
	27	Maintain LOS With arget
	28	Maintain Separation Between Aircraft
	29	Maneuver NOE
	30	Mask Aircraft, Lateral
	31	Mask Aircraft, Vertical
	32	Monitor Terrain, Aerial Approaches

FUNCTION NO.	FUNCTION
33	Monitor Threat Warning Displays
34	Perform Evasive Maneuvers
35	Prepare Report, Digital Message Device
<b>36</b> ,	Prepare Weapon, Fire and Forget/Cannon
37	Prepare Weapon, Laser Cueing
· 38	Receive Haudoff, Laser Cueing
39	Receive Message, Designation Coordination, Digital
40	Receive Message, Standard, Digital
41	Receive Message (Standard), Radio, Voice
42	Record Target Data
43	Respond to Threat Warning Signal
44	Stabilize Aircraft
45	Surve; Target Area, Automatic Search
46	Survey Target Area, Manual Control, Visual Search
47	Survey Waypoint
48	Track Target
49	Transmit Message (Brief), Voice, Brief
50	Transmit Message (Standard), Voice
51	Transmit Report, Digital
52.	Unmask Aircraft, Lateral
53	Unmask Aircraft, Vertical
54	Unmask Sensor
55	Update Doppler, Overfly Stored Waypoint
56	Update Doppler, Remote Landmark
57	Estimate Adjustments, Automatic
58	Engagement, Air-to-Air, Establish Attack Run

#### SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

	Phase	F	ECC	NNA	ISS	ANCE										<del></del>			_
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#### SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

	Phase Segment 2:										Method	,			,				-
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#### SUMMARY OF CONCURRENT AND SEQUENTIAL. WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

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### SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

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#### SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--AUTOMATION OF SELECTED SUBSYSTEMS

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·	Phase		TAF	GET	SE	RVICE									_				
	Segment 12	:	ENG	AGE	MEN	T, AIR-TO-	-GRC	UND	· ·		Method_	ΑĮ	OTU	NOMO	us,	LOA	L		
	FLI	GHT				SUI	POF	T		•	MIS	ssic	N			CON	OTA CUR		T
UM. ECS.	Function	٧	A	С	P	Function	V	A,	С	Р	Function	V	A	c	P	v	A	c	P
10	, 54	2		2	4	1							,			2	'	2	.4
20						33	2	2	2		,					2	2	2	
30							-				27a	4		1	4	4		1	4
40						,								1	1			1	1
50						1					01	5	3	3	3	, 5	3	3	3
60	53	4	,	2	4			-								4		2	4
70		,									23	5	3	4	.3	5	3	4	3
80											•		1	1			1	1	
90																	,		
100																			
110	12	2		5	4	,					·					2		5	4
20	'	2		6	4											2		6	4
30	,												1						
40	,										,								
50																			
160																			
170						• .					٠								
180																	1		Π

Segment I	3:	ENC	GAGI	MEN	IT, GROUND	TAI	RGET	<u>r                                      </u>		Method	Al	JTOI	MOM	ous,	LOB	L	
FL	CHT				SUI	PPOF	₹T	,		; : MIS	SSI	ON			CON		
Function	٧	A	С	P	Function	V	A	Ċ	P	Function	V	A	С	P	v	A	С
54	2		2	4	33	2	2	2							4	2	4
					·					27	4		1	4	4		1
ŀ										01 ,	5	3	. 3	3	5	3	3
53	4		2	4								·			. 4		2
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12	2		5	4										·	2		5
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	Phase		TAR	RGET	SE	RVICE													
•	Segment 14	:	ENG	AGE	MEN	IT, GROUND	TAF	RGET	•		Method_	RE	MOT	E D	ESI	GNAT	ION		
	FLI	GHT	•			SUF	POF	RT.	,		MIS	SIC	N	,		CON	OTA CUR		T,
.	Function	٧	A	С	P	Function	v	Α	С	P	Function	v	A	С	P	v	Α	С	P
	25	1		2	4	41	2	3	4	. 3						3	3	<sup>'</sup> 6	7
	,							3	4								3	4	
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						42	- 5	3	. 3	3	,					5	3	3	***
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	. 29	5		5	4	, ,										5		5	4
		5		5	4											5		5	4
	25	ı		2	4							,				1		2	4
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											23	5	3	4	3	5	3	4	3

	Phase		TAR	GET	SE	RVICE.	<u></u>										<del></del>	,	•
	Segment 14	:	ENG	AGE	MEN		TAF	RGET	(0	ont	.) Metho	od_	REN	10TI	E DE	SIGN	ATI	ON	
•	FI.I	GHT	•		1	SUE	POF	RT	i		MIS	ssic	ON			CON	OTA		<b>T</b> .
CUM. SECS.	Function	٧	Α	С	P	Function	v	A	С	P	Function	v	A	С	P	V	A	С	P
190						ı													,
200					,	50	5	1	4	3						5	1	4	3
210								3	4	3	,					- \	3	4	3
220					-			1.	4	3	١	,			,		1	4	3
230	,							3	4	3	·						3	4	3
240	53	4		2	4	•					,			,		4		2	4
250	,			1	1				,									1	1
260						, ,					23e		3	3	3		3	3	3
270						49	5	i	4.							5	1	4	
280	31	2		2	4											2		2	4
290	·			1	1 .			ı	·		1							1	1
300											1								
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330											1				,				
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350	·																		
360 ,	·	Γ	Π		Γ	1			,										

Segment 15	· :	ENC	GAGE	MEN	T, SOFT TA	RGE	TS			Method_	.CA	NNC	N F	IRE	, но	VER	
FL]	GHT				SUF	POR	T,			, MIS	sic	N	•	1	CON	OTA CUR	
Function	v	A	С	P	Function	v	A	С	P	Function	v	A	С	P	v	A	С
29	5		4	4	'		·								5		4
25	1		2	4											1		2
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						,	3	4	3					,		3	4
29	5		4	4	ę.					-					5		4
	5.		4	4	,		Ŀ								5		4
18	6		5	4			<u> </u>		Ŀ			Ľ			6		5
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53	4		2	4											4		2
			1	1											1		1

Phase	· · ·	TAI	RGET	SE	ERVICE					·					*	<del></del>		
Segment 1			GAGE	MEN	IT, SOFT TA	ARGI	ETS	(Co	nt.	) Meth	od_	CAI	поии	N FI	RE,	ЮИ	ER	
FL	IGH:			•	SUI	PPOI		,			SSI	ÓN			CON	CUF		T
Function	◊	. A	С	P	Function	V	A	С	P	Function	v	A	С	P	v	A	С	]
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	Function	V	 С	P	Function	V	A	С	Р	Function				P	v	Α	С	P
	25	1	 2	4	06	1		2	,	·				١,	2		4	4
	,				41	2	3	4	3		,				2	3	4	
	, ,						3	4				-				3	4	
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			•				3	4	3							3	4	
	,			·	42	5 '	3	3	3						5	3	3	
						5,		1	1						5		1	
						5		4							5		4	
						5		3	-						5	L	3	L
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	18	6	6	5											6	ŀ	6	Ŀ
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	25	1	2	4		<u> </u>	<u> </u>		_	,	_				1		2 .	ľ
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	FLI	GHT	į	•		SUI	POP	RT	1		MIS	SSI	ON				OTA	
Funcți	lon	٧	A	С	P	Function	v	A	С	Þ	Function	v	A	С	P	v	A	Ī
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	Phase		TAR	GET	SE	RVICE													
	Segment 17	:	HAN	DOF	F,	GROUND TAR	GET	's			Method	D)	GIT	'nL	'				
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CUM. SECS.	Function	٧	A	С	P	Function	V	A	С	P	Function	V	A	С	P	v	A	С	P
10	54	2		2	4	33	, 2	2	2					_ '		4	2	4	4
20									-		01	5	3	3	3	5	3	3	3
30	31	2		2	4	42	5	3	3	3			٠			7	3	5	7
40 .				1	1		5		1	1	,					5		2	2
50							5		4							5	•	4	
60					,		5		3	1						5		3	1
70	, ,										1							,	
80						51	5	1	6	1						5	1	6	1
90							5	1	6							5	1	6	
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160												Γ							
170																			
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	Phase	<del></del> -	TAR	RGET	SE	RVICE													
	Segment 18	:	HAN	DOF	F,	GROUND TAR	GET	:			Method_	V	OIC	E					
	FLI	GHT	ŗ	1		SUF	POF	RT			MIS	SSI	ON			CON	OTA UR		T .
CUM. SECS.	Function	٧	A	С	P	Function	V	A	С	P	Function	V	A	С	P	V	A	С	P
10	54	2		2	4	33	2	2	2		·					4	2	4	4
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30	,					<b>,</b> :			1	ì								1.	1
40						•					48	4		3	4	4		3	4
50											01	5	3	3	3	5	3	3	3
60	31	2		2	4	,									, ,	,2		2	4
70	ı			1	1													1	1
80	r v					50	5	1	4	3						5	1	4	3
90	·							3	4	3						,	3	4	3
100	·	_						1	4	3		·					1	4	3
110	,							3	4	3	1.						3	4	3
120	,	Ŀ							,										
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140											,								
150						1					·								,
160															·				
170																			
180																			

	Segment 19	·	HAN	DOF	FT	ARGET					Method_	LA	SEF	CU	<u>EIN</u>	G			
	FLI	GHT	ı			SUF	POR	T,			MIS	sįic	N		'	CON	OTA CUR		T
	Function	v	A	С	P	Function	V	A	С	P	Function	V	A	С	P	V	A	С	P
,	54	2		2	4						,					2		2	4
,						33	2	2	·2		/					2	2	2	
,	1										48	4		3	4	4		3	4
,						,					·	4		3	4	4		3	4
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Segment 2	0:_	HOL	DIN	IG C	HECKS					Method				1				_
FI	IGHT	· .			SUE	POF	RT.			MIS	SSIC	N	**		T CON	OTA CUR		17
Function	V	A	С	P	Function	V	A	С	P	Function	v	A	С	P	v	A	С	Ī
25	1		2	4		•									1		2	Ī
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						6		6	2						6		6	
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Phase		TAR	GET	SE	RVICE	· ·				<del></del>							
Segment 2	ı:	OVE	RWA	TCH	<u> </u>			·	<del></del> -	Method_						<del>-</del>	
FLI	CHT			•	SUF	POR	T			MIS	SIC				T CON	OTA CUR	
Function	v.	A	С	P	Function	v	A	С	P	Function	V	A	С	P	V	Α	С
29	5		4	4				,	· ·						5		4
	5		4	4											5		4
25	1		2	4							,				1	·	2
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54	2		2	4	33	2	2	2							4	2	4
										. 27	4		1	4	.4		1
	1.									,			1	1			1
'										32	5	3	4	3	5	3	4
										09	5	3	4	3	5	3	4
			_								5		2		5	<u> </u>	2
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	Phase	<del>,</del>	TAF	RGET	SE	RVICE			-			·							
	Segment 22	: <u>-</u>	REC	EIV	E H	IANDOFF	-	,			Method_	V	OIC	E		······			
	FLI	GH1	ŗ			SUI	POP	RT		•	MIS	SSI	ON	•		CON	OTA		T
CUM. SECS.	Function	₹	'A	С	P	Function	V	, A	С	P	Function	V	A	С	P	V	A	С	P
10	, 25	1		2	4	06	, 1		2							1	-	4	4
20						41	2	3	4	3						2	3	4	3
30					-	,		3	4		-						3	4	
40	·		,					3	4								3	-4	
50								·З	4								3	4	
60								3	4	3	1						3	4.	3
70	1					, 42	5	3	3	3	,					5	3	3	3
80	·	,					5		1	1	,					5		1	1
90							5		4							5		4	
100				•			5		3	1			·			5		3	1
110						07	.5		5	2						5		5	2
120											·								
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160						·	,								,				
170	,												,	,				·	
180	' '																		

Phase			TAR	GET	SE	RVICE													
Segme	nt 23	:	TEA	мс	OOR	DINATION					Method_								
	FLI	GHT		٠		SUI	POF	RT.			MIS	sic	N			CON	OTA CUR		Г
Func	tion	v	Å	С	P	Function	v	A	С	P	Function	V	A	c	P	v	A	С	P
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	Phase	1	CARC	ET	SER	NICE, AIR-	-TO-	-AII	<u> </u>			<u> </u>							
	Segment 24	:	ACC	u'Is	ITI	ON					Method	F	REE	SE	ARCH				<del></del>
	FI.I		, , ,			sui		ŧТ	ı		· MIS	SIG	ON				OTA	L REN	т
CUM. SECS.	Function	Ÿ	A	С	P	Function	v	Ą	С	P	Function	v	A	Ċ	P	v	A	С	P
10	25	ı		2	4	06	1		2					·		2		4	4
20	54	2		2	4											2		2	4
30						3.3	2	2	2			٠.			,	2	2	2	
40								-			16	5	٠3	4	3	5	3	4	3
50	,								-			1		2		2		2	,
60							٠,					5		2		5		2	
70											26	5	٠ 3	3	3	5	3	3	3
80 1						49	5	1	4	3						5	1	4	3
90					•	. 27	4		1	4						4		1	4
160									ì	1.			·					1	1
110											19	5	3	3	3	5	3	3	3
120												5		4		5		4	
130																			
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	Phase					RVICE, AIR					Method			MAS	KFD	POS	ודו	ON:	
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s.	Function	v	A	С	P	Function	v	٨	С	Р	Function	v	A	С	Р	v	A	С	P
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Segment 2	6 : <u> </u>	ENC	AGE	MEN	T AIR-TO-A	IR				Method_	RI	JNN	ING	FIR	Ε, Ο	ANN	ON
FL	I GHT	•	,		SUF	POI	tT	•		MIS	SSIC	ON			CON	OTA	
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	Segment 27	:	ENG	AGE	MEN	T, AIR-TO-	AIR				Method_	Ri	INNI	NG	FIR	E, .1	ISS	İLE	
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Segment 2	): <u> </u>	REC	EIV	E 1.	ANDOFF					Method_	VC	ICI	<u> </u>				
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Function	V	A	C	P	Function	V	A	С	P	Function	'V	A	С	P	v	A	С
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APPENDIX G

FUNCTION ANALYSIS WORKSHEETS

(REVISED TO REFLECT DISTRIBUTION OF FUNCTIONS TO TWO CREWMEMBERS)

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				FUNCTION AC	Acquire Position Data	ata		No. 01
(APPROXIDATE)	8,5 seconds			METHOD AU	Automatic	,		Copilot
PERFORMAN	PERFORMÂNCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		,
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	_
16 Align	Sight reticle	Sensor control/ sight ACS	Visual Align (V-4)	Sight adjustment needed (C-1)	Control pressure (P-4)	<u> </u>	Start 5.5	٠,
04 Activate	Laser rangefinder	Laser rangefinder Al	Visual Alignment (V-4)	Laser on target? (C-2)	Switch activation (P-1)	1.5	6.0 - 7.5	,
122 Note	Coordinates (Sensor capture)	Sensor subsystem Coordinate display NDC	Visual symbolic (V-5)	Encoding (C-4)		٠.	8.0 - 8.5	
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				FUNCTION AC	FUNCTION Acquire Position Data	ata		NO. UZ
TOTAL TIME 28 (APPROXIMATE)	28 seconds	, '	•	METHOD	Shift From Known Point	oint		Cr.: 10t
PERFORMAI	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	S COMMENTS	,
16 Align	Sight reticle	Sensor control/ sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressures (P-4)	<u>~</u>	S + 5.5	
36 Select	Wide FOV	Sensor controls, FOV ACP	Visual monitor (V-1)	Point usable? (C-1)	Switch activation (P-1)	o.	6.0 - 7.6	,
94 Identify	Landmark	Sensor scene, map NSM	Visual Discrimi- nation (V-5)	Correct Landmark (C-6)	Map Orienta- tion (P-5)	'n	7.5 - 12.5	
-89 Estimate	Shift (to target)	Sensor acene, map.	Visual Discrimi- nation (V-6)	Correct Shift (C-7)	Map Orienta- tion (P-5)		13 - 28	
· .							,	·

				FUNCTION A	Align Heading on Target Bearing	arget Bearin	No. 03	
(APPROXIMATE)	34.5 seconds		٠	METTHOD			Pilot	
PERFORMA	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COPPENTS	
13 Adjust	Heading	Fiight Controls Sensor Display FAD	Alignment of bench- marks (V-4)	Heading adjustment needed (C-5)	Direction power adjustment (P-4)	30	s + 30.5	
181 Stabilize	Aircraft	Flight controls, surrounding visual field FV	Relative movement in sur- rounding referents (V-2)	Control adjustments to stop drift, heading change (C-1)	Small adjust- ments in power, cyclic antitorque (P-4)	<b>S</b>	29.5 - 34.5	
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No. 04	Copilot	NO1	UOUS CONTENTS	s - 14.5	S - 14.5	15 + 60	Time for PE 1 and PE 2 total 14.5 seconds. The two PEs will be performed simultaneously during scan/survey of target area for 14.5 seconds.	
-		DURATION (SECS)	DISCRETE/ CONTINUOUS	. 2	7	45		
sess Damage			PSYCHOMOTOR	LOS Control (P-4)	LOS control (P-4)	Keyboard entries	: :	
FUNCTION Assess Damage	METHOD	WORKLOAD COMPONENTS	COGNITIVE	What per- centage? (C-7)	Destroyed, repairable, usable?	Format content	3	
		WORK	SENSORY	Visual search of terrain (V-6)	Visual inspection (V-6)	Visual symbolic		
			SUBSYSTEM(S)	Sensor display scene AS	Sensor display scene AS	Message device CM		
1	62 seconds	PERFORMANCE ELEMENTS	OBJECT	Percentage of target coverage	Targets disabled	Messege		
	TOTAL TIME 62 (APPROXIMATE)	PERFORMAN	\TERB	87 Estimate	79 Determine	142 Record	1 .	

					FUNCTION	Check Aircraft Systems (Holding)	tems (Holdin	g)	No. 05
	TOTAL TIME 106 (APPROXIMATE)	108 seconds			1 1				Both
	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCKITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	,
COPILOT	48 Check	Fue 1	Fuel system display DF	Visual symbolic mental calcula- tions (V-5)	Quantity (mission time) (C-6)			s - 10.5	
COPILOT	50 Check -	Engine status displays	Engine status displays DE	Visual symbolic (V-5)	Within safe limits (C-2)		10	11 - 21	
ВОТН	47 Check	Aircraft equipment	Life support	Visual inspec- tion (V-6)	Available and coperating (C-6)	1	30	21.5 - 51.5	ю
COP 11.0T	49 Check	Caution/ Warning Indicators	Malfunction detection equipment (warning) DM	Visual symbolic (V-5)	No indica- tions jeo- pardizing mission continua- tion (C-2)	Switch operation (P-1)	10	52 - 62	
вотн	52 Check	Cockpit	Personal equipment P	Visual inspection (V-6)	Secure (C-6)		98	62.5 - 92.5	
вотн	138 Perform	Checklist Items	Checklist PC	Visual reading (V-7)	No condi- tions jeo- pardizing mission continua-	;	15	93 - 108	
					t1on (C-6)			Each PE occurs in sequence.	curs in

TOTAL TIME 11.	11.5 seconds		í	FUNCTION	FUNCTION Check Aircraft Systems (Power Change)	stems (Power (	hange)	No. 06
(APPROXIMALE)				METHOD				r 110t
PERFORMAN	PERFORMANCE ELEMENTS		MOP	WOTKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	COMPLENTS	·
14 Adjust	Power	Power control FP		Amount necessary (C-1)		ئ.	S + 1.0	
51 Check	System instruments	Engine and caution displays DEW	Visual symbolic (V-5)	In limits? Desire setting (C-2)		10	1.5 - 11.5	
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				FUNCTION Ch	Check Bearing and Range	Range		No. 07
TOTAL TIME 3.0	3.0 seconds		ı		, /			Copilot
(120)			AGOIT	STARROUND GAO TAGOL		I DIRATTON		
PERFORMAN	PERFORMANCE ELEMENTS		NOW.	CONTONENTS		(SECS)		,
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	MENTS	
170 Select	Waypoint (desired)	Navigation control N	Visual symbolic (V-5)	Correct waypoint? (C-3)	Switch activation (P-2)	Н	s - 1,5	•
46 Check	Course, distance to waypoint	Navigation display ND	Visual symbolic (V-5)	Adjustment to heading? (C-5)		н	2.0 - 3.0	
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No. UB Copilòt		YTS	'0.	32.5	
	NC C	OUS COMMENTS	S - 2.0	2,5 - 32,5	
ton	- DURATION (SECS)	DISCRETE/ CONTINUOUS	1.5	30	
Check Sensor Operation		PSYCHOMOTOR	Sensor switch (P-1)	Sensor controls fine adjust- ments required (P-2)	
FUNCTION Che	WORKLOAD COMPONENTS	COGNITIVE	Sensor operating (C-6)	Adjust- ments needed -brightness -contrast -gain -polarity -frequency -boresight (C-6)	
	WORK	SENSORY	Visual inspect (V-6)	Visual inspect (V-6)	
.•		SUBSYSTEM(S)	Sensor subsystem AC	Sensor subsystem	
					,
32,5 secondo	PERFORMANCE ELEMENTS	OBJECT	Sensor(s)	Sensors	
TOTAL TIME 32.	PERFORMAN	VERB	168 Select	15 Adjust	

				FINCTION Ch	FINCTION Check Sighting	,	No. 09
TOTAL TEME 38	38 seconds		•	METHOD		·	Copilot
(APPROXIMATE)			,				
PERTORNAN	PERTORMANCE ELEMENTS	,	WORK	WORKLOAD COMPONENTS		DURATION (SECS)	•
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMPENTS
111 Monitor	Surroundings	Visual, unaided V	Visual detect movement (V-2)	Possible sighting? (C-2)		20	S + 20.5
192 Survey	Approaches to AO	Sensor display scene AS	Visual Detect Movement (V-2)	Possible sighting? (C-2)	Adjust sensor LOS (P-4)	50	s - 20.5
24 Align	Sight	Sensor display sight ADS	Visual align (V-4)	Any sighting (C-2)	Sensor LOS adjustment (P-4)	<b>ν</b>	21 - 26
36 Select	Sensor FOV	Sensor controls FOV ACF	Visual monitor (V-6)	Target centered (C-1)	Discrete activation (P-1)	1.0	26 - 27.5
98 Identify	Threat	Sensor displays- DIV	Movement, shape, heat signature (V-2)	Level of threat friend/foe (C-4)	1	10	28 - 38
,					,	,	PE 1 and 2 will be continuous throughout function but interrupted by PE 3, 4, and 5.
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No. 10	Copilot			',	1						elay 4	lelay 4	elay 4	lelay 4
			COMMENTS	s - 10.5	11 - 56		56.5 - 61.5	56.5 - 61.5	56.5 - 61.5 61.5 - 71.5 71.5 - 116.5	56.5 - 61.5 61.5 - 71.5 71.5 - 116.5	56.5 - 61.5 61.5 - 71.5 71.5 - 116.5 10 seconds delay awaiting PE 4	56.5 - 61.5 61.5 - 71.5 71.5 - 116.5 10 seconds d awaiting PE	56.5 - 61.5 61.5 - 71.5 71.5 - 116.5 10 seconds d awaiting PE	56.5 - 61.5 61.5 - 71.5 71.5 - 116.5 awaiting PE
		DURATION (SECS)	DISCRETE/ CONTINUOUS	<u> </u>		_	,		,	,	,			
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Coordinate Mission			PSYCHOMOTOR	Switch activation (P-1)	Switch activation (P-1)				Switch activation (P-1)	Switch activation (P-1)	Switch activation (P-1)	Switch activation (P-1)	Switch activation (P-1)	Switch activation (P-1)
FUNCTION CO.	METHOD	WORKLOAD COMPONENTS	COGNITIVE	Correct radio? (C-3)	Encoding (C-4)		Verify content established (C-4)	Verify content established (C-4)	Verify content established (C-4) Message received? Authenti- cation correct? Mission	Verify content established (C-4) Message received? Authenti- cation correct? Mission proc? (C-5)	Verify conten. established (C-4) Message received? Authenti- cation correct? Mission proc? (C-5)	Verify content established (C-4) Message rectived? Authenti- cation correct? Mission proc? (C-5)	Verify content established (G-4) Message received? Authenti- cation correct? Mission proc? (G-5)	Verify conten. established (C-4) Message received? Authenti- cation correct? Mission proc? (C-5)
		WORK	SENSORY	Vis symbol (V-5)	Auditory, message content (A-3)		Auditory content (A-3)	Auditory content (A-3)	Auditory Content (A-3) Auditory, message Content (A-3)	Auditory Content (A-3) Auditory, message Content (A-3)	Auditory Content (A-3) Auditory, message content (A-3)	Auditory content (A-3) Auditory, message content (A-3)	Auditory Content (A-3) Auditory, message Content (A-3)	Auditory Content (A-3) Auditory, message content (A-3)
			SUBSYSTEM(S)	Communication system CS	Communication system CT		Communication system CR	Communication system CR	Communication system CR CR Communication system CC	Communication system CR Communication system CC	Communication system CR Communication system CC	Communication system CR Communication system CC	Communication system Communication system CC	Communication system CR Communication system CC
	116.5 seconds	PERFORMANCE ELEMENTS	OBJECT	Radio, security	Message (extended)		Acknowledgement	Acknowledgement	Acknowledgement Mission number	Acknowledgement Mission number	Acknowledgement Mission number	Acknowledgement Mission number	Acknowledgement Mission number	Acknowledgement Mission number
	(APPROXIMATE)	PERFORMANC	VERB	166 Select	205 Transmit		113 Note	113 Note	dinate	dinate	dinate	dinate	dinate	dinate

				FUNCTION Co	Coordinate Target Selection	Selection	. No. 11
TOTAL TIME 102.5	.5 seconds	,			•		Copilot
(AFFRUALITALE)			act.	STATION COMPAND		DIRATION	
PERFORMAN	PERFORMANCE ELEMENTS	<u> </u>	WORR	WORKLOAD COMPONENTS		(SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS
150 Select	Communication channels and security	Communication system CS	Visual sysbolic (V-5)	Adequacy of setting equipment operating (C-3)	Selector switches, speech (P-1; P-3)	10	S - 10.5
124 Note	Target data	Communication system CR	Auditory (A-3)	Authentic message required (C-6)	İ	30	11 - 41
141 Record	Target data	Message device FCC CM	Visual symbolic (V-5)	Encoding (C-4)	Keyboard entries (P-7)	10	41.5 - 51.5
196 Transmit	Message (brief) Acknowledgement	Communication system CT	Auditory (V-3)	Encoding recall (C-4)	Switches, speech (P-1; P-3)	s,	52 - 57
68 Coordinate	Attack with other attack	Communication system CC	Auditory (A-3)	Target assessment Firing schedule (C-5)	Transmitter switches (P-1)	55	57.5 - 102.5
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		_		PINCTION De	FINCTION Deniov to Cover			No. 12
TOTAL TIME 18.5 seconds	5 seconds		,	METHOD				Pilot
PEPEOPMAN	DEPENDENT PLEMENTS		WORK	WORKLOAD COMPONENTS	, I	DURATION		
						(SECS)	1	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
43 Check	Obstacle clearance	Outside visual field V	Visual inspec- tion (V-1)	Adequate clearance (G-2)		· w	s - 5.5	
83 Establish	Dash	Flight control F	Visual, relative movement (V-2)	Control adjustment needed? (C-1)	Control Pressure (P-4)	` <b>m</b>	5.5 - 8.5	
181 Stabilize	Aircraft	Flight controls, outside visual field FV	Visual, detect movement (V-2)	Control adjustment needed? (C-1)	Control pressure (P-4)	<b>'</b>	8.5 - 13.5	
143 Reduce	Altítude	Flight controls, outside visual field	Visual, relative movement (V-2)	Control adjustment needed (C-1)	Control pressure (P-4)	<b>S</b>		· ·
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				TINCTION DO	Designate Target		No. 13
TOTAL THE 27	27 seconds			t			Copilot
(APPROXIMATE)	•		,				
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS
16 Al1gn	Sight reticle	Sensor control sight ACS	Vis align (V-4)	Adj needed (C-1)	Control Pressure (P-4)	<u>.</u>	S - 5,5
36 Select	Narrow FOV	Sensor control FOV ACF	Vis monitor (V-1)	Targer centered? (C-1)	Discrete activation (P-1)	1.0	9 - 7.0
33 Arm	Laser designator	Laser controls ACL	Vis symb (V-5)	Laser ready? (C-2)	Discrete activation (P-1)	2.5	7.5 - 10
02 Activate	Laser designator	Laser designator ALD	Vis detection (V-2)	Target lased? (C-2)	Discrete activation (P-1)	10	10.5 - 20.5
125 Note	Weapon impact	Sensor display AD	Vis monitor (V-1)	Target hit? (C-2)	\$ 	s	21 - 26
72 De-Arm	Laser	Laser cont ACL	Vis symb (V-5)	Laser safe? (C-2)	Discrete activation (P-1)	٠ <b>٠</b> .	26.5 - 17
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		÷	, .				
			·	,			

				FUNCTION De	FUNCTION Detect Aerial Threat	at	No. 14	14
(APPROXIMATE)	31.5 seconds		·	METHOD AU	Automatic Search, Cueing	Sueing	Cop	Copilot
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	,	DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPENTS	
190 Survey	Airspace	Sensor display AS	Visual monitor (V-1)	Cueing symbol? (C-2)		- 20	s + 20.5	
76 Detect	Cueing symbol	Sensor display AI	Visual symbolic (V-5)	Signal detection (C-2)	•	٠,	21 - 26	
16 <b>A</b> 11£3	Sight reticle	Sensor control sight ACS	Visual alignment (V-4)	Target centered? (C-1)	Control press. (P-4)	<b>S</b>	26.5 - 31.5	

				FUNCTION De	Detect Aerial Threat	at	No	No. 15
TOTAL TIME 31 (APPROXIMATE)	31 seconds			METHOD	Unaided		ပိ	Copilot
PERFORMAL	PERFORMANCE ELEMENTS	-	WORK	WORKLOAD COMPONENTS	3	DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
191 Search	Airspace	Visual, unaided V	Visual survey (V-1)	Area clear? (C-6)		12.5	S-+ 13	=7
74 Detect	Movement	Visual, unaided V	Visual detect (V-2)	Signal (maneuver) (C-2)	: :	2	13 - 15	
176 Direct	Sensor (to target)	Sensor controls a/c direction indicated AC	Visual align (V-4)	Approx bearing to sighting? (C-6)	Control pressure (P-4)	v	15.5 - 20.5	
99 Identify	Ihreat	Visual, unaided V	Visual; movement shape (V-2)	Orientation of a/c. Type of a/c. (C-4)		'n	21 - 26	
98 Identify	Threat	Sensor threat display (visual) DIV	Movement shape heat signature (V-2)	Level of threat Friend/ foe (C-4)		10	21 - 31	
97 Identify	Ihreat	Sensor threat display (aural) DT	Tone(s) continu- ous or intermit- tent (A-3)	Type of threat a/c. Level of threat (C-4)		10	21 - 31	
			,			,	No transition time provided to first discrete PE (2).	time rst ).

PSYCHOMOTOR   CONTINUOUS   COMMENTS	TOTAL TIME 20.	seconds			PUNCTION De	FUNCTION - Detect Target (Ground)	(pur	No. 16
Substitution   Subs	(APPROXIMAIE)	,			METHOD Fr	ee Search		CODITOL
OBJECT SUBSYSTEM(S) SF.:SORY COCKITIVE PSYCHONOROR OBJECTION CONTINUOUS COMPERSION OF CONTINUOUS COMPERSION CONTINUOUS COMPERSION CONTINUOUS COMPERSION CONTINUOUS COMPERSION CONTINUOUS COMPENSION CONTINUOUS COMPENSION CONTINUOUS CO	PERFORMAN	CE ELEMENTS		WORK	LOAD COMPONENTS		DURATION (SECS)	
Target area   Sensor display   Visual   Area clear?   Control   12.5 S + 1	VERB	OBJECT	SUBSYSTEM(S)	SF::SORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	•
Movement Sensor display Visual Signal 2 13 acene scene ("movement")    AS	147 Search	Target area	Sensor display scene AS	Visual survey (V-1)	Area clear? (C-6)	Control pressure (LOS) (P-4)	12.5	S + 13
Sight Sensor display/ Visual Target Control 5 15.5  ADS (V-4) (C-2) (P-4)  (V-7) (C-2) (P-4)	75 Detect	Movement	Sensor display scene AS	Visual detection (V-2)	Signal (movement) (C-2)	,	7	•
		Sight	Sensor display/ sight ADS	Visual alignment (V-4)	Target Centered (C-2)	Control pressure (P-4)	. <b>.</b>	
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				PUNCTION De	Detect Target			No. 17
TOTAL TIME 13	seconds				Prepoint, Auto Cueing	ing		Copilot
(AFFROALFMALE)								
PERFORMAN	PERFORMANCE ELEMENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
209 Verify	Target data in FCC	FCC display ID	Visual symbol (V-5)	Data complete? (C-6)	İ	'n	s - 1.0	
165 Select	Sensor prepoint	Sensor controls AC	Visual symbol (V-5)	Prepoint option (C-3)	Switch activation (P-1)	1.0	1.5 = 2.5	
76 Detect	Cueing symbol	Sensor display/ target cue AT	Visual symbol (V-5)	Signal recognition (C-2)		<u> </u>	. 8	
24 Align	Sight	Sensor display (sight) ADS	Visual alignment (V-4)	Target centered? (C-2)	Control pressure (P-4)	'n	8 - 13	
			,			,		
				1				
					,		,	
		,		,				

	TOTAL TIME 21.5 (APPROXIMATE)	.5 seconds	•		METHOD	·		,	Both
	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPLIATS	
PILOT	103 Maintain	Obstacle clearance	Flight controls outside visual	Visual detect (V-2)	Verify Clearance (C-2) (P-4)	Flight control pressures	21.5	S + 21.5	
PILOT	92 Follow	Course	Nav display Flight controls NDF	Visual symbol (V-5) (C-5)	Course adjustment needed?	Control pressures (P-4)	21.5	S + 21.5	
COPILOT	55 Check	Position	Outside visual map VM	Visual symbol (V-5)	Decoding (C-4)	•		.5 ~ 10.5	
COPILUI	43 Check	Obstacle clearance	Outside visual V Clearance (V-1)	Visual inspect masking? (C-2)	Adequate space,		<b>~</b>	11 - 16	
PILOT	181 Stabilize	Aircraft	Flight controls Outside visual FV	Visual detect movement (V-2)	Adjustments needed? (C-1)	Control - pressures (P-4)	<u> </u>	16.5 - 21.5	<b>~</b>
	<b>.</b>				,			PE 1 and PE 2 contir throughout function overlapping PE 3, 4, 5.	E 2 continueus function g PE 3, 4, and

								9
				FUNCTION ES	Estimate Range			NO. 19
TOTAL TIME 10 seconds (APPROXIMATE)	seconds			METHOD	Automatic			Copilot
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		ı
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	<u>v</u>	s - 5.5	, , , , ,
36 Select	FOV	Sensor controls, FOV ACF.	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6 - 7.0	
04 Activate	Laser range finder (LRF)	Sensor/LRF AL	Visual align signal (V-4)	Target lased? (C-2)	Discrete activation (P-1)	1.5	7.5 - 9	
132 Note	Range	Sensor display/ range AR	Visual discrim (V-5)	In range? (C-6)	<u> </u>	۸.	9.5 - 10	
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			2	INCITION	Fetfmate Rance			No. 20
TOTAL TIME 33	seconds			1				
(APPROXIMATE)				METHOD	Unaided Estimation			Copilot
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Adjustment needed? (C-1)	Sight control pressure (P-4)	'n	s - 5.5	
36 Select	FOV	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Discrete activation (P-1)	1.0	6.0 - 7.0	
135 Note	Tgt/mil dimensions	Sensor display AD (V-6)	Visual discrim dimension (C-6)	Evaluate target pressure (P-4.)	Sight control	٠,	7.5 - 12.5	
88 Estimate	Range	Sensor display		Estimation (C-7)	† 	20 -	13 - 33	•
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				PTINCTTON EV	Evaluate Position			No. 21
TOTAL TIME 46.	46.5 seconds					١		Copilot
(APPROALFMALE)								
PERFORMAI	PERFORMANCE ELEMENTS	1	WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
193 Survey	Surroundings	Sensor display scene AS	Visual, movements, shapes (V-2)	Area safe? (C-6)	Sensor controls (P-4)		S + 20.5	
177 Slew	Sensor	Sensor controls AC	Visual survey (V-1)	Where to point? (C-3)	Sensor controls (P-4)	un .	21 - 26	
. 39 Check	Visual access	Sensors, maps NSM	Visual inspection (V-6)	Adequate area FOV? (C-6)	Sensor controls (P-4)	20	26.5 - 46.5	· · · · · · · ·
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	ı			FUNCTION F1	Fire Cannon			No. 22
TOTAL TIME 15 (APPROXIMATE)	15 seconds	•		METHOD				Copilot
PERFORMAL	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	-	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
207 Verify	Adjusted sight alignment	Sensor display scene AS	Visual, symbolic (V-5)	Verify sight picture (C-2)		- 2	S + 2.5	
08 Activate	Gun trigger	Fire control system.		Trigger post- tion. Recognize (C-2)	Switch activation (P-1)	٧,	2.5 - 3.0	
136 Observe	Tracers, impact	Sensor display sight ADS	Visual trace (V-3)	On target (C-2)	/	<b>v</b>	3,5 - 8,5	
11 Adjust	Alignment	Sensor display sight ADS	Visual align (V-4)	Adjustment needed (C-1)	Control pressures (P-4)	'n.	9 - 14	ı <u>.</u>
71 De-arm	Gun	Fire control system	Vfsual, symbolic (V-5)	Gun secured (C-2)	Switch or switch sequence (P-1)	νį	14.5 - 15	
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				FUNCTION F1	Fire Weapon			No. 23
TOTAL TIME 9 seconds (APPROXIMATE)	econds							Copilot
PERFORMAN	PERFORMANCE ELEMENTS	٠	WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	1
2CS Verify	Firing con straints met	Fire control dirlay ID	Visual discrimi- nation (V-5)	System ready? (C-6)	Control pressures (P-4)	5	s + 5.5	
146 Release	Weapon	Fire control system	Visual Auditory (V-2, A-1)	Weapon shot? (C-2)	Switch activation (P-1)	2	88 1	ı
73 De-arm	Weapon	Fire control system	Visual symbolic (V-5)	Weapon system tem secured (C-2)	Switch activation (P-1)	sec/ switch	8.5 - 9	
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TOTAL TIME 38 (APPROXIMATE)		ı					
( TT TT TT TT TT TT TT TT TT TT TT TT TT	38 seconds			METHOD			Copilot
			diaci:	Similar Carron		NOTTA GIA	-
PERFORMAN	PERFORMANCE ELEMENTS	÷	WOIGK	WORKLOAD CUMPONENTS		(SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	S COMMENTS
196 Transmit	Message (brief) alert	Communication system (transmit)	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation speech (P-1, P-3)	<b>"</b>	S + 5.5
113 Note	Ack/ready	Communication system (receive) CR	Auditory. Interpret (A-3)	Decoding (C-4)	•	'n	n - 9
196 Transmit	Message (brief) Alert for sensor cue	Communication system (transmit)	Auditory. Speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1,P-3)	<b>S</b>	11.5 - 16.5
16 Align	Sight reticle	Sensor control/ sight ACS	Visual align (V-4)	Ad Justment needed (C-1)	Control pressure (C-4)	in,	17 - 22
02 Activate	Laser designator	Laser designator ALD	Visual detect (V-2)	Signal recognition (C-2)	Switch activation (C-1)	10	22.5 - 32.5
113 Note	Ack/tgt detected	Communication system (receive) CR	Auditory interpret (A-3)	Decoding (C-4)	1	, س	33 - 58
					,		,
		•					

				H HOLLEN	Hover Masked		No. 25	
TOTAL TIME 170 seconds	seconds			1			Pilot	
(APPROXIMATE)				TOTAL STATE OF THE				
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
63 Control	Altitude	Flight controls	Detect vertical movement (V-2)	Power adjust- ment needed? (C-1)	Control pressures (P-4)	170	S + 170	
64 Control	Drift	Flight controls F	Detect horizon- tal movement (V-2)	Cyclic adjustment needed? (C-1)	Control pressures (P-4)	170	S + 170	1
66 Control	Heading	Fiight controls F	Detect rotation (V-2)	Antitorque adjustment needed? (C-1)	Control pressures (P-4)	170	s + 170	
40 Check	Lateral clearance	Outside visual field V	Visual survey (V-1)	Verify clearance (C-2)	!	2.0		
		\ \		,			PE 4 repetitive during 170-second function time.	
		·						

TOTAL TIME 12.	12.5 seconds	.•		METHOD	FUNCTION Identity larget	,		Copilot
(AFFINALFALE) PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPLENTS	
16 Align	Sight reticle on target	Sensor control/ sight ACS	Visual alignment (V-4)	Sight adjustment needed? (C-1)	Control pressures (P-4)	S	s + s · 5	
36 Select	Narrow FOV .	Sensor controls, FOV ACF	Visual monitor (V-1)	Target centered? (C-1)	Switch activation (P-1)	1.0	6 - 7.0	
96 Identify	Target	Sensor display AD	Visual inspect (V-6)	Friend or foe? Type of target	None	<b>ب</b>	7.5 - 12.5	
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		•		- FUNCTION Ma	FUNCTION Maintain LOS With Target	Target		No. 27
TOTAL TIME 45.5 seconds (APPROXIMATE)	5 seconds		•	METHOD				Copilot
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONFINUOUS	COMMENTS	
36 Select	Wide FOV	Sensor controls, FOV -ACF	Visual monitor (V-1)	Adjustment needed? (C-1)	Switch activation (P-1)	1.0	S + 1.5	
194 Track	Target	Sensor control AC	Visual align (V-4)	Match slew rate (C-3)	Control pressure (P-4)	4.5	S + 45.5	
145 Regain	T0S	Sensor control AC	Visual aim (V-4)	Planning search (C-5)	Control pressure (P-4)	<u>د</u>	S + 5.5	
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No. 28	Pilot			ENTS	15.5	\$*0*	Time estimate for PE 1 overlaps continuous PE 2. PE 2 time will vary with mission requirements.
stween Aircraft		DITE ATTON .	(SECS)	CONTINUOUS COMMENTS	15 S + 15.5	40 S + 40.5	Time over PE vary requ
Maintain Separation Between Aircraft		-		PSYCHOMOTOR C	<u> </u>	Control pressure (P-4)	
FUNCTION Mai	1 1	omenion and	WUKKLUAD CUMPUNENTS	COGNITIVE	Verify relative position (C-2)	Adjustments needed (C-1)	
	•	- Creece	WORK	SENSORY	Visual, detect movement (V-2)	Visual, detect relative movement (V-2)	
	•			SUBSYSTEM(S)	Visual sensor display VD	Flight controls; outside visual; sensor display FWD	
	40.5 seconds		PERFORMANCE ELEMENTS	OBJECT	A/C movement	Separation	
	TOTAL TIME 40.5	(VELWATEWITE)	PERFORMAN	VERB	110 Monitor	105 Maintain	

					FUNCTION Maneuver NOE	neuver NOE			NO. 27
	(APPROXIMATE)	80 seconds		4	METHOD				Both
-	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION	l Ni	
<b></b>							(SECS)	/4	
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	OUS COMPLENTS	
PILOT	103 Maintain	Obstacle clearance	Outside visual Flight controls FV	Visual detect (V-2)	Verify clearance (C-2)	Control pressures (P-4)	<u>\$</u>	s + 80	
PILOT	12 Adjust	Flight modes	Outside visual Flight controls FV	Visual detect movement (V-2)	Select appropriate flight modes (C-3)	Control pressures (P-4)	80	s + 80	1
COPILOT	56 Check	Position	Outside visual Navigation display VND	Visual symbol (V-5)	Decoding (C-4)	Control pressures (P-4)	10	S + 10	
COPILOT	164 Select	Flight path	Outside visual Navigation display VND	Visual symbol (V-5)	Selection (C-3)	-	m	e + &	
PILOT	92 Follow	Course	Navigation display, fiight controls	Visual symbol (V-5)	Anticipating directional adjustments (C-5)	Control pressures (P-4)	08,	<b>S</b> + 80	
							)	PE 1, 2, and 5 continuous dur function, over discrete PE 3	PE 1, 2, and 5 continuous during entire function, overlapping discrete PE 3 and 4.
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			,	FUNCTION Ma	Mask Aircraft, Late	Lateral	No. 30
TOTAL TIME 11.	11.5 seconds			METHOD			Pilot
PERFORMAN	PERFORMANCE ELENENTS		WOR	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPENIS
40 Check	Obstacle clearance (lateral)	Outside visual field	Visual inspection (V-1)	Adequate clearance (C-2)	•		\$ + 2.5
84 Establish	Drift	Flight controls F	Visual, relative movement (V-2)	Control adjust needed (C-1)	Control pressures (P-4)	<b>S</b>	2.0 - 7
181 Stabilize	Alteraft	Flight controls Outside visual field	Visual detect movement (V-2)	Control adjustment needed? (C-1)	Control pressures (P-4)	'n	6.5 - 11.5
•		,		, ,			All three PEs overlap. Subtract 1 second overlap between PE 1
							and 4; and 4 second overlap between 2 and 3.
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				M MOTTONIA	Mask Afraraft, Vertical	fcal	No. 31	. 1
TOTAL TIME 14	14 seconds	,	•	METHOD		_	Pilot	1
(APPROXIMATE)								ŧ
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
43 Check	Obstacle clearance (lateral and vertical)	Outside visual field V	Visual inspect clearance (V-1)	Verify descent path clear (C-2).		<u>~</u>	S + 5.5	
143 Reduce	Altitude	Flight controls Outside visual Field	Visual relative movement (V-2)	Control adjustment needed (C-1)	Control pressures (P-4)	<b>~</b>	5 - 10	
181 Stabilize	Aircraft	Flight controls Outside visual field FV	Visual detect relative movement (V-2)	Control adjustment needed (C-1)	Control pressures (P-4)	<b>'</b>	9 - 14	
1		1				1	All three PEs overlap in time. Subtract 1	
,			ч		ı	,	second over tap between PE 1 and PE 2 and 1 second overlap between PE 2 and 3.	·
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							,	· · · · · · · · · · · · · · · · · · ·
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				PUNCTION MO	Monitor Terrain, Aerial Approaches	rial Approac	nes no. 32
(APPROXIMATE)	30.5 seconds			METHOD			Copilot
PERFORMAN	PERFORMANCE ELECTENTS		WORK	WORKLOAD COMPONENTS	-	DURATION	
	,					(SECS)	
VERB	osrecr	SUBSYSTEM(S)	SENSOŘY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS
177 Slew	Sensors	Sensor control	Visual survey (V-1)	Were to point (C-3)	Sensor control pressures (P-4)	<u>,                                    </u>	\$*\$ + S
107 Monitor	Approaches	Sensor display scene AS	Visual survey (V-1)	Select slew rate (C-3)	Sensor control pressures (P-4)	30	5 + 30.5
24 Align	Sight	Sensor display (sight) ADS	Visual align (V-4)	Possible sighting? (C-2)	Sensor control pressures (P-4)	<b>5</b>	6 + 30.5
36 Select	Narrow FOV	Sensor control FOV ACF	Visual monitor (V-1)	Sighting centered (C-1)	Switch activation (P-1)	1.0	11.5 + 30.5
							Continuous PEs 1 and 2 overlap each other and PE 3 and 4. PE 3 and 4 will be repetitive during the function period whenever a possible sighting occurs.

1	11			
No. 33	Both			
		,	COMPENTS	\$ + \$.
Displays		DURATION (SECS)	DISCRETE/ CONTINUOUS	
ming			E S	in the state of th
Monitor Ihreat Warning Displays			PSYCHOMOTOR	
FUNCTION MOR	METHOD	WORKLOAD COMPONENTS	COGNITIVE	Signal recognition (C-2)
		WORK	SENSORY	Auditory, visual, signal detection (V-2) (A-2)
			SUBSYSTEM(S)	Threat displays
	5.5 seconds	PERFORMANCE ELEMENTS	OBJECT	Threat displays
	TOTAL TIME 5.5 (APPROXIMATE)	PERFORMANC	VERB	112 Monitor

				FUNCTION Pe	Perform Evasive Maneuvers	leuvers		No.
(APPROXIMATE)	30 seconds		• •	METHOD				Pilot
FORMAN	PERFORMANCE ELENENTS	,	HORK	WORKLOAD COMPONENTS		DURATION (SECS)		
	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR -	DISCRETE/ CONTINUOUS	COMMENTS	
	Hard turns	Fiight controls F	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	30	s + 30	
	Altitude sharply	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	21	S + 15	,
	Airspeed	Flight controls FV	Visual orient (V-4)	Planning anticipating (C-5)	Control pressures (P-4)	4,	+ +	
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No. 35	Copilot							, , , , ,					
			COMMENTS	S + 3.5	9 - 7	6.5 - 8.5	9 - 117.5	118 - 121					
	vice	DURATION (SECS)	DISCRETE/ CONTINUOUS	e ,		8	108.5	m	,		<u> </u>	,	
Prepare Report	Digital Message Device		PSYCHOMOTOR	Switch activation (P-1)	Switch activation (P-1)	Serial discrete (P-7)	Serial discrete (P-7)	Serial discrete (P-7)		,	,		
FUNCTION Pre	i 1	WORKLOAD COMPONENTS	COGNITIVE	Ready? (C-2)	Right radio? Secure? (C-3)	Proper format? (C-5)	Encoding (C-4)	Correct address code? (C-3)		,			
		WORE	SENSORY	Visual symbol (V-5)	Visual symbol (V-5)	Visual symbol (V-5)	Visual symbol (V-5)	Visual symbol (V-5).	,				
			SUBSYSTEM(S)	Message device CM	Message device, CM	Message device CM	Message device CM	Message device CM		, , ,	,	ı	
	seconds	PERFORMANCE ELEMENTS	OBJECT	Display	Transmission mode	Format	Message	Address code(s)			,	,	
	TOTAL TIME 121 (APPROXIMATE)	PERFORMANC	VERB	61 Clear	54 Check	160 Select	82 Enter	80 Enter					

				FUNCTION Pr	FUNCTION Prepare Weapon, Fire and Forget/Cannon	re and Forge	-/Cannon	No. 36
TOTAL TIME 7 8 (APPROXIMATE)	7 seconds			METHOD				Copilot
- PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOF.	DISCRETE/ CONTINUOUS	COMMENTS	
171 Select	Weapon	Fire control (panel) IP	Visual symbolic (V-5)	Selection (C-3)	Switc <sup>k</sup> , activation (P-1)	5	S + 5.5	
57 Check	Weapon status	Fire control display ID	Visual symbolic (V-5)	Verify (C-2)			6 - 7	:
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				PUNCTION Pr	FINCTION Prepare Weapon, Laser-Guided	ser-Guided	No. 37	37
TOTAL TIME 12.	12.5 seconds			METHOD			Cop	Copilot
( ALTENDATION )			-			NO. THE COLUMN		
PERFORMA	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS	, _	(SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
171 Select	Weapon	Fire control panel IP	Visual symbolic (V-5)	Selection (C-3)	Switch activation	<u>.</u>	S + S	
149 Select	Laser code	Fire control panel	Visual symbolic - (V-5)	Enter code (C-+)	Gontrol switches (P-1)	Ś	6 - 11	. "
57 Check	Weapon status	Fire control display ID	Visual symbolic (P-5)	Verify (C-2)		н '	11.5 - 12.5	
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				FINCTION Re	Receive Handoff		No. 38	
TOTAL TIME 38.	38.5 seconds	,		l l	Laser Cueing		Copilot	
(AFFRUALFIALE)				'	8			
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD- COMPONENTS		DURATION (SECS)	,	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE	COMMENTS	
128 Note	Message alert	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)		ي. د	ر د. د د. د	
196 Transmit	Message (brief) Ack/Ready	Communication systems CI	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	<b>s</b>	6 - 11	
177 Slew	Sensor	Sensor control	Visual monitor (V-1)	Where to point (C-3)	Control pressures (P-4)	<b>v</b>	11.5 - 16.5	
120 Note	Alert (lasing)	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)		<b>v</b>	17 - 22	τ .
76 Detect	Cueing symbol	Sensor display	Visual symbol (V-5)	Signal recog (C-2)		ا <b>ن</b>	22.5 - 27.5	
16 Align	Sight reticle	Sensor control ACS	Visual align (V-4)	Automatic (C-1)	Control pressures (P-4)	'N	28 - 33	
196 Transmit	Ack message (target detecteu)	Communication system CI	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activation Speech (P-1, P-3)	'n	33.5 - 38.5	1
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No. 39		Copilot					•			
prdination				COMMENTS	\$ + 5 · 2	3,5	8.5 - 10.5			
stonerion Co.	STERIOR CO.		DURATION (SECS)	DISCRETE/ CONTINUOUS	2	ν,	2			
Donathy Massace Destanation Coordination	ים דגם וובסספום לים	Digital		PSYCHOMOTOR		Switch activation (P-1)	1	•		
MOTITO	FUNCTION NE	METHOD D1	WORKLOAD COMPONENTS	COGNITIVE	Signal recognition (C-2)	Response select (C-3)	Signal recognition (C-2)	,		
P			WORK	SENSORY	Auditory detect Visual symbol (A-1)	Visual symbol Auditory symbol (V-5) (A-1)	Visual symbol Auditory signal (V-5) (A-1)			
	1	,		SUBSYSTEM(S)	Message device CM	Message device CM	Message display? CD			
		10.5 seconds	PERFORMANCE ELEMENTS	OBJECT	Message alert	Message (Ack/Ready)	"Splash" signal			
		TOTAL TIME 10.5 (APPROXIMATE)	PERFORMANC	VERB	129 Note	173 Send	134 Note			

				FUNCTION Re	Receive Message, St	Standard		No. 40
TOTAL TIME 30	30 seconds			METHOD D1	Digital			Copilot
PERFORMAN	PERFORMANCE ELEMENTS	,	MORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
129 Note	Message alert	Message device CM	Visual Symbol Auditory signal (V-5) (A-1)	Stgnal recog (C-2)	i	2	s + 2.5	
173 Send	Message (Ack/Ready)	Message device CM	Visual symbol Auditry signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	ň	3 - 3.5	
121 Note	Message content	Message display	Visual read (V-7)	Decoding (C-4)	•	25	4.0 - 29	
173 Send	Message (Ack/Roger)	Message device CM	Visual symbol Auditory signal	Response select (C-3)	Switch activation (P-1)	ð	29.5 - 30	
		,	(v-5) (A-1)					
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				FINCTION Re	Receive Message (Standard)	tandard)		No. 41
TOTAL TIME 53	53 seconds			į .	Radio, Voice			Copilot
(APPROXIMATE)		•		'				
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	,	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
128 Note	Message alert	Communication system (receive) CR	Auditory interp (A-3)	Decoding (C-4)	i	<u></u>	s + 5.5	·
196 Transmit	Message (brief) Ack/Ready	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding - (C-4)	Switch activation speech (P-1, P-3)	٠ <u>.</u>	6 - 11.5	
127 Note	Message	Communication system (receive) CR	Auditory interp (A-3)	Decoding (Ç-4)		25	12 - 37 .	
70 Copy	Data	Personal Equipment Cockpit items P	Visual symbolic (V-5)	Encoding (C-4)	Symbolic production (P-6)	16	37.5 - 47.5	'
196 Transmit	Message (bricf) Ack/Roger	Communication system (transmit) CT	Auditory speech feedback (A-3)	Encoding (C-4)	Switch activator (P-1, P-3)	<b>s</b> , ,	48 - 53	
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				FUNCTION Re	Record Target Data		No. 42
(APPROXIMATE)	5 seconds		-	METHOD			Copilot
PERFORMAN	PERFORMANC: ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS
61 Clear	Display	Message device CM	Visual symbolic (V-5)	Verify ready (C-2)	Switch activation (P-1)	en .	5 + 3.5
81 Enter	Target data	Target keyboard system (FCC) AK	Visual symbolic (V-5)	Encoding (C-4)	Data entry (P-7)	35	. 39
189 Store	Target data	Target keyboard system (FCC) AK	Visual symbolic (V-5)	Select storage option (C-3)	Switch activation (P-1)	<b>.</b>	39.5 - 40.5

	.1				FUNCTION Re	FUNCTION . Respond to Threat Warning Signal	Warning Signs	al	No. 43
٠	TOTAL TIME 7 s (APPROXIMATE)	seconds	•		METHOD				Both
	PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)	1	
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
Вотн	133 Note	Acquisition/ lock-on signal	Threat warning display DT	Auditory interpret (A-4)	Decoding (C-4)	1 6 8	٠.	S + 1.0	
COPILOT	90 Estimate	Signal bearing/ distance	Threat warning display DIV	Visual align, (V-4)	Signal evaluation (C-6)	-	<u>,</u>	1.5 - 4.5	
COPILOT	01 Activate	Chaff dispenser	Chaff dispenser switch SC	Visual symbol (V-5)	Select option (C-3)	Switch activation (P-1)	2	- 7 - 5	,
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				FUNCTION St	Stabilize Aircraft			No44
IOTAL TIME 5 seconds (APPROXIMATE)	seconds			METHOD				Pilot
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	·
63 Control	Altitude	Flight controls F	Detect vertical movement (V-2)	S-R (C-1)	Control pressures (P-4)	5	S + S	
64 Control	Drift	Fiight controls	Detect horizontal movement (V-2)	S-R (C-1)	Control pressures (P-4)	'n	s + s .	
66 Control	Heading	Flight controls	Detect yaw (V-2)	S-R (C-1)	Control pressures (P-4)	'n	\$ + \$	
43 Check	Obstacle clearance	Outside visual field V	Visual monitor (V-1)	Verify clear (C-2)	1 E 8 8 8 1	<b>s</b> ,	ی + بی	
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PERFORMANCE ELEMENTS - WORKLOAD COMPONED    Select Auto search Auto search AC (Y-5)   Sensor controls Symbol (C-3)    Solect Coverage area AC (Y-5)   School in Symbol (C-4)    Sonsor display School display Survey (Ysual Stgnal School in Symbol (C-4)    Solect Symbol (C-4)   Selection (Y-5)    Solect Symbol (C-5)    Solection (Y-5)   Selection (C-4)    Solection (Y-5)   Selection (C-5)    Solection (Y-5)   Selection (C-4)    Solection (Y-5)   Selection (C-5)    Sole	TOTAL TIME 25 seconds	seconds			FUNCTION Sur	Survey Target Area Automatic Search		1.	Copilot
Performance Einebris	(APPROAIMALE)							'	
Select Auto search Sensor controls (Visual Selection Switch CowThWilliam Co. Co.) Select Search pattern, Ac Controls (Visual C.) Select Search pattern, Sensor controls (Visual Encoding Reyboard L.) Sensor controls (Visual Encoding Reyboard L.) Sensor controls (Visual C.) Sensor display Sensor display (Visual Signal Signal Signal Signal C.) AS Sensor display (Visual Signal C.) Sensor display Sensor display (Visual Signal C.) Sensor display Sensor display (Visual Signal C.) Sensor display Sensor display (Visual Signal C.) Sensor display Sensor display (Visual Signal C.) Sensor display Sensor display (Visual Signal C.) Sensor display Sensor display (Visual Signal C.) Sensor display Sensor display (Visual Signal C.) Sensor display Sensor display (Visual Signal C.)	PERFORMAN	CE ELEMENTS.		WORK	LOAD COMPONENTS		DURATION (SECS)	•	
Auto search Anto search Anto search Anto search Anto search Anto search Anto search Anto symbol (C-3) (C-3) (C-3) (C-3) (C-3) (C-3) (C-3) (C-4)	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	1	
Search pattern, Sensor controls (15-4) (C-4) (Reyboard 1.5) (C-5) (P-7)	148 Select	Auto search	Sensor controls AC	Visual symbol (V-5)	Selection (C-3)	Switch activation (P-1)	1.5	+	
Display Sensor display Visual Signal 25 S scene (V-5) (C-2) (C-2)	69 Select	Search pattern, coverage area	Sensor controls AC	Visual symbol (V-5)	Encoding (C-4)	Keyboard entries (P-7)	1.5	2.5 - 3.0	
	108 Monitor	Display	Sensor display scene AS	Visual survey (V-5)	Signal recognition (C-2)		25	S + 25	
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HETROD MANUAL CONTECT, VISUAL SERVICE  Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Controls Sensor Control					UNCITON	Survey Target Area		X	No. 46
PERFORMANCE ELFERTS SUBSYSTEM(S) SENSORY COGNITIVE Sensor	(APPROXIMATE)	seconds			1 1	nual Control, Vi	sual Search	S	Copilot
Sensor Controls Visual Select rate, Control CONTINUOUS  Sensor Controls Sensor Controls Sensor AC (V-1) (C-3)  tor Display Sensor display Visual Sign, recog-AS (V-1) (C-2)  AS (V-1) (C-2)  Control Sensor S	PERFORMAN	CE ELEMENTS		WORK	LOAD COUPONENTS		DURATION (SECS)		
Sensor Sensor controls Wisual Select rate, Control AC (v-1) Display Sensor display Wisual Sign, recog- AS (v-1) AS (v-1) AS (v-1) AS (v-1) AS (v-1)	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPENTS	
Display Sensor display Visual Sign, recognican scene (v-1) (C-2)  AS (v-1) (C-2)		Sensor	Sensor controls AC	Visual survey (V-1)	Select rate, Direction (C-3)	Control pressures (P-4)	<u>s</u>	5°5 + S	
	108 Monitor	Display	Sensor display scene	Visual survey (V-1)	Sign, recognition (C-2)	,		- S + 25	
		,						PE 1 time overlaps with PE 2.	rlaps
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			•	FUNCTION Sur	FUNCTION Survey Waypoint	,		No. 47
(APPROXIMATE)	seconds		•	METHOD			,	Copilot
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
32 Approach	Waypoint	Navigation display. ND	Visual symbolic (V-5)	Further move- ment needed? (C-5)	,	30	s + 30	1
210 Verify	Position	Outside visual map VM	Visual symbolic Visual survey (V-5, V-1)	Evaluative (C-6)	Map orienta- tion (P-5)	10	S + 10	٠,

S./				FUNCTION Track Target	ack Target			No. 48
(APPROXIMATE)	enilose de la companya de la company		•	METHOD				Copilot
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		1
	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMPENTS	
16 Align	Sight reticle	Sensor control sight ACS	Visual align (V-4)	Target center (C-1)	Control pressures (P-4)	<b>5</b>	S + 5 + 8	
194 Track	Target	Sensor controls AC	Visual align (V-4)	Slew rate (C-3)	Control pressure (P-4)	45	6 - 45	1 1

				FUNCTION IF	Transmit Message (Brief)	Brief)		No. 49
TOTAL TIME 16	16 seconds			WETHOD Vo	Voice, Brief			Copilot
PEPEOPMAN	DEDENOMANCE ET EMENTS		WORK	PONE		DURATION		
		,	ı			(SECS) DISCRETE/		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
150 Select	Comm. channel and security	Communication system (select) CS	Visual symbolic (V-5)	Correct channel? (C-3)	Switch activation speech (P-1, P-3)	10	s + 10.5	
196 Transmit	Message (brief)	Communication system (transmit) CT	Auditory speech feedback (A-3)	Message content (C-4)	Switch activation speech (P-1, P-3)	بر س	11 - 16	

SUBSYSTEM(S) SENSORY
<b>8</b> 4
<b>X</b>
Auditory speech feedback (A-3)
,

				FUNCTION IT	Transmit Report		Z	No. 51
~	seconds				Digital		5	Copilot
(APPROXIMATE)			1					
PERFORMAN	PERFORMANCE ELEGANTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY-	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
173 Send -	Message (alert, Ident code)	Message device CM	Visual symbol (V-5)	Message sent? (C-3)	Button (P-1)	٠ <u>,</u>	s + 1.0	1
118 Note	Acknowledgement, Authentication code	Message display CM	Visual symbol Auditory signal (V-5) (A-1)	Authentic reply? (C-6)	•	2	1.5 - 3.5	
173 Send	Message	Message device CM	Visual symbol Auditory signal (V-5) (A-1)	Response select (C-3)	Switch activation (P-1)	v,	4 - 4.5	
118 Note	Acknowledgement, Authentication code	Message display CD	Visual symbol Auditory signal (V-5)	Authentic reply? (C-6)		2	2 - 7	
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No. 52	Pi lot				÷			
			COMPLENTS	S + 2.5	8 1 8	8.5 - 13.5	14 - 21	
teral	,	DURATION (SECS)	DISCRETE/ CONTINUOUS		in .	<b>`</b> ທຸ		
FUNCTION Unmask Aircraft, Lateral	·		PSYCHOMOTOR		Control pressures (P-4)	Control pressures (P-4)	!	
FUNCTION Unn	метнор	WORKLOAD COMPONENTS	COCNITIVE	Adequate cleárance? (C-2)	S-R (C-1)	S-R (C-1)	Verify weapon path clear	
		WORKI	SENSORY	Visual inspect (V-1)	Visual monitor, relative movement (V-2)	Visual, derect relative movement (V-2)	Visual orient (V-4)	
	1		SUBSYSTEM(S)	Outside visual field V	Fiight control	Flight controls, Outside visual field FV	Outside visual field V	
	21 seconds	PERFORMANCE ELEMENTS	OBJECT	Lateral clearance	Drift	Aircraft	Weapon path clear	
	TOTAL 1 IME 21 8 (APPROXICALE)	PERFORMANC	VERB	40 Check	84 Establish	181 Stabilize	59 Check	

				FUNCTION Un	FINCTION Unmask Aircraft. Vertical	ertical		No. 53
TOTAL TIME 18	18 seconds			METHOD		,		Pilot
(APPROXIMALE)								
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
101 Increase	Altitude	Flight controls sensors visual field FVD	Visual, detect movement (V-2)	Verify LOS target clear (C-2)	Flight control pressures (P-4)	10	s + 10.5	
64 Control	Drift	Flight controls F	Detect horizon- tal move- ment (V-2)	S-R (C-1)	Control pressures (P-4)	<b>.</b>	S + 18	
66 Control	Heading	Flight controls F	Detect rotation (V-2)	S-R (C-1)	Control pressures (P-4)	<b>S</b>	S + 18	
59_Check	Weapon path clear	Visual field V	Visual orientarion (V-4)	Verify clear of obstacles (C-2)			11 - 18	,
181 Stabilize	Aircraft	Flight controls, Outside visual field FV	Visual detect movement (V-2)	S-R (C-1)	Control pressures (P-4)	<b>S</b>	11 - 16	
, .			,				PE 2 and 3 occur simultaneously and continuously during total time.	sly and during
				,		<u> </u>		
			,					

	TOTAL TIME 21.	21.5 seconds	,		FUNCTION Unmask Sensor	mask Sensor		NO. 54	
					METHOD			DOCU	
	PERFORMAN	PERFORMANCE ELEMENTS -		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
	VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTO 1	DISCRETE/ CONTINUOUS	COMMENTS	
PILOT	101 Increase	Altitude	Flight controls FVD	Visual detect movement (V-2)	Verify LOS target-clear (C-2)	Control pressures (P-4)	01	s + 10.5	
COPILOT	53 Check	Sensor LOS	Sensor display, controls ADC	Visual survey (V-1)	Verify clear (C-2)	Control pressures (P-4)	'n	11 - 16	
PILOT	181 Stabilize	Aircraft	Flight controls FV	Visual, detect movement (V-2)	Adjustments necessary (C-1)	Control pressures (P-4)	<b>.</b>	16.5 - 21.5	
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G-57					1		· · · · · · · · · · · · · · · · · · ·		
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TOTAL TIME 19.	19.5 seconds		٠.	TO CONTRACT	Owerfly Stored Waynoint	point	c)	Copilot
(APPROXIMATE)			•	I	פווו) אימוכם יים			
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	CONTINUOUS	COMMENTS	
100 Identify	Waypoint	Outside visual, map VM	Visual discrimi- nation (V-6)	Confirm location (C-6)	Orient map (P-5)	<b>'</b>	S + 5.5	
163 Select	Update mode, preset waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall position number (C-4)	Discrete adjustment (P-2)	1.0	6.0 - 7.0	
137 Overfly	Landmark	Flight controls outside visual field	Visual track (V-3)	Select heading (C-3)		<b>v</b>	7.5 - 12.5	
09 Activate	Update switch	Navigation controls NC	Visual symbolic (V-5)	Verify over landmark (C-2)	Switch activation (P-1)	r.	13 - 14	
161 Select	Navigation mode, next waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall waypoint desired (C-4)	Discrete adjustment (P-2)	۸'n	14.5 - 19.5	
			,		1			•
		·						
•							,	
							,	
				•	1			-
	,							

				1			2 - 14	
				FUNCTION	Update Doppier		NO. 50	
TOTAL TIME 22. (APPROXIMATE)	22.5 seconds			METHOD Re	Remote Landmark	T .	Copilot	ot
-								
PERFORMAI	PERFORMANCE ELEMENTS	,	WORK	WORKLOAD COMPONENTS		DURATION (SECS)	•	
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	,
94 Identify	Landmark	Sensor scene display NSM	Visual discrim (V-6)	Confirm land- mark (C-6)	Orient map (P-5)	່ທ	S + S • S	
152 Select	Preset coord1- nates	Navigation controls NC	Visual symbolic (V-5)	Recall post- tion number (C-4)	Discrete adjustment (P-2)	н	6 - 7.0	, ,,ı =
167 Select	Remote update doppler	Navigation controls NC	Visual symbolic (V-5)	Recall posi- tion number (C-4)	Switch activation (P-1)	н	7.5 - 9.0	
24 Align	Sight on landmark	Sensor display/ sight ADS	Visual alignment (V-4)	Verify land- mark centered (C-2)	Control Pressures (P-4)	ι.· .	9,5 - 14,5	,
04 Activate	Laser range .inder	Laser range finder AL	Visual Align (V-4)	Verify feature lased (C-2)	Switch activation (P-1)	1.5	15 - 16.5	,
09 Activate	Update (remote)	Navigation controls NC	Visual. symbolic (V-5)	Verify update (C-2) (C-4)	Switch activation (P-1)	ed .	17.0 - 18.0	<del> </del>
161 Select	Nav mode, next waypoint	Navigation controls NC	Visual symbolic (V-5)	Recall way- point desired (C-4)	Discrete adjustment (P-2)	'n	18.5 - 22.5	**************************************
	,							
· · · · · · · · · · · · · · · · · · ·				·	,	,	,	'

				FUNCTION ES	Estimate Adjustments	ts	No.	. 57
TOTAL TIME 22. (APPROXIMATE)	22.5 seconds			METHOD	Automatic		CO	Copilot
			aug.	Silla Triodrigo di 10 m		WOTER STATE		
PEKFORMA	PEKFUKMANCE ELEMENIS		WOKK	WOKKLUAD CURIFURENIS	,	(SECS)		
VERB	OBJECT	SUBSYSIEM(S)	SENSORY	COGNITIVE	PSYCHOMOTOR	DISCRETE/ CONTINUOUS	COMMENTS	
36 Select	Wide FOV	Sensor controls FOV ACF	Visual monitor (V-1)	Adjustment needed (C-1)	Switch activation (P-1)	1.0	S + 1.5	
126 Note	Impact point	Sensor scene display AS	Visual detect (V-2)	Verify impact (C-3)	? ! !	<u>ر</u>	2 - 7	,
16 Align	Sight reticle on impact point	Sensor control sight ACS	Visua: alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	<b>~</b>	7.5 - 12.5	
36 Select	Narrow FOV	Sensor control FOV ACF	Visual monitor (V-1)	Adjustment needed (C-1)	Switch - activation (P-1)	1.0	13 - 14	
16 Align	Sight reticle on impact point	Sensor control sight ACS	Visual alignment (V-4)	Adjustment needed (C-1)	Control pressure (P-4)	<b>n</b>	14.5 - 19.5	
04 Activate	Laser range finder	Laser range finder AL	Visual alignment (V-4)	Verify laser on spot (C-2)	Switch activation (P-1)	1.5	20 - 21.5	
122 Note	Impact coordinates	Sensor display NDC	Visual symbolic (V-5)	Decoding (C-4)	1	٧.	22 - 22,5	
				,				
			1					
							ı	

				FUNCTION Eng	Engagement, Air-to-Air	-Air		No. 58
TOTAL TIME 20	20 seconds				Establish Attack Run	un		Pilot
( W. I. Powert Property )		7)	_					
PERFORMAN	PERFORMANCE ELEMENTS		WORK	WORKLOAD COMPONENTS		DURATION (SECS)		
VERB	OBJECT	SUBSYSTEM(S)	SENSORY	COCNITIVE	PSYCHOMOTOR	DISCRETE CONTINUOUS	COMPLENTS	
86 Establish	Attack run	Outside visual flight controls FV	Visual, direction (V-4)	Establish closure course (C-3)	Control pressures (P-4)	50	s + 20	,
91 Fly	Intercept headings	Outside visual flight controls FV	Visual, rela- tive movement (V-4)	Stop relative movement (C-3)	Control pressures (P-4)		s + 20	
106 Monitor	Airspeed	Flight instrument displays FD	Visual, symbolic (V-2)	Check maximum airspeed (C-3)		H	S + 1	
					1		· at	
			1	,				ı
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#### APPENDIX H

SUMMARIES OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS (REVISED TO REFLECT DISTRIBUTION OF FUNCTIONS TO TWO CREWMEMBERS)

### APPENDIX

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FUNCTION NO.	FUNCTION
. 01	Acquire Position Data, Automatic
02	Acquire Position Data, Shift From Known Point
03	Align Heading on Target Bearing
04 .	Assess Damage
05 .	Check Aircraft Systems (Holding)
96	Check A/C Systems (Power Change)
07	Check Course Required
08	Check Sensor Operation
' 09	Check Sights
10	Coordinate Mission
11	Coordinate Target Selection
12	Deploy to Cover
13	Designate Target
14	Detect Aerial Threat, Automatic Search, Cueing
15	Detect Aerial Threat, Unaided
16	Detect Target (Ground), Free Search
i 7	Detect Target, Prepoint, Auto Cueing
18	Establish Position (Firing or Observation
19	Estimate Range, Automatic
20	Estimate Range, Unaided Estimation
21	Evaluate Position
22	Fire Cannon
23	Fire Weapon
24	Handoff Target, Laser Cueing
25	Hover Masked
26	Identify Target
27	Maintain LOS With Target
28	Maintain Separation Between Aircraft
29	Maneuver NOE
30	Mask Aircraft, Lateral
31	Mask Aircraft, Vertical
. 32	Monitor Terrain, Aerial Approaches

FUNCTION NO.	FUNCTION
33	Monitor Threat Warning Displays
34	Perform Evasive Maneuvers
35	Prepare Report, Digital Message Device
36	Prepare Weapon, Fire and Forget/Cannon
37	Prepare Weapon, Laser Cueing
38	Receive Handoff, Laser Cueing
39	Receive Message, Designation Coordination, Digital
40 '	Receive Message, Standard, Digital
41	Receive Message (Standard), Radio, Voice
42	Record Target Data
43	Respond to Threat Warning Signal
44	Stabilize Aircraft
45	Survey Target Area, Automatic Search
46	Survey Target Area, Manual Control, Visual Search
47	Survey Waypoint
. 48	Track Target
49	Transmit Message (Brief), Voice, Brief
50	Transmit Message (Standard), Voice
51	Transmit Report, Digital
52	Unmask Aircraft, Lateral
53	Unmask Aircraft, Vertical
54	Unmask Sensor
. 55	Update Doppler, Overfly Stored Waypoint
5,6	Update Doppler, Remote Landmark
57	Estimate Adjustments, Automatic
58	Engagement, Air-to-Air, Establish Attack Run

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	RECO	MAIS	RECONNAISSANCE															
	SEGMENT 1:		DAMA	GE AS	BOMB DAMAGE ASSESSMENT	ENT				,		ME	METHOD						
,	ı		FLIGHT	F			SUP	SUPPORT	r 3	1	,	MISSION	<b>z</b>		,		TOTAL CONCURRENT	L RENT	
CUM.	FUNCTION	>	₹.	ပ	P.	FUNCTION	Δ	V	ပ	Ъ	FUNCTION	Λ	Ą	ပ	Ь	۷.	Ą	၁	Ъ
10	29	2/0		2/0	4/0	33	2/2	2/2	2/2.							4/2	2/2	4/2	
20		0/5		0/4	4/0	,							`	-		0/5		0/4	4/0
30	18	1/0		3/0	4/4											1/0		3/0	4/4
70	,	9/0		9/0	0/5											9/0		9/0	0/5
20	25	2/0		1/0	0/4											2/0		1/0	4/0
		2/0		0\1	4/0	90	2/0		2/0	1				,		1/0		3/0	4/0
2 H-5	54	2/0		1/0	4/4	,										2/0		1/0	4/4
80		2/0		0/2	7/7	95	0/5		0/3	0/4						2/5		0/5	8/4
90		2/0		0/2	7/7		0/5		0/3	0/4	04	9/0		0/7		2/11		0/12	8/4
100	25	2/0		1/0	0/7							0/7		0/4	0/7	2/7		1/4	4/7
110	1	2/0		1/0	7/0	,				,		07/7		0/4	0/,	2/7		1/4	4/7
120		2/0	,	1/0	0/5				÷		,	0/7		0/4	1/0	-2/7		1/4	4/7
130		2/0		1/0	0/5	. 51	0/5	0/1	9/0	0/1		0/7		0/4	0/7	2/7		0/5	4/7
140						,	0/5	0/1	9/0	0/1	,	2/0		0/4	7/0	2/7		0/5	4/7
150																0/5	0/1	9/0	0/1
160	,															0/5	0/1	9/0	0/1
170								,											
180													,		-		1		
)																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	RECO	NNAIS	RECONNAISSANCE						ŀ									
	SEGMENT 2:	EVAD	E RAD	AR LO	EVADE RADAR LOCK-ON				·			MET	METHOD						•
	٠,		FI.T.GHT	<u> </u>			SUP	SUPPORT		•	· W	MISSION	-		•	J	TOTAL	RENT	
CUM.	FUNCTION	P	¥	U	a	FUNCTION	Δ	A	S	Р	FUNCTION	<b>&gt;</b>	A	· o	Ъ	Λ	A	ပ	م
SECS.		2/0		3/0	-4/0							ľ				2/0		3/0	4/0
20		0/5		0/5	+	43		4/4	4/4				ı			0/5	4/4	6/4	4/0
30	12	2/0		5/0	4/0		9/0	4/4	9/0							2/5	4/4	3/6	4/0
40		2/0		0/9	4/0	,			;							2/0	0/9	4/0	
20	25	2/0		1/0	-0/5						,	٠.		,		2/0		1/0	4/0
09		2/0		2/0	4/0	67	0/5	0/1	9/0	0/3		,			. '	2/5	0/1	2/4	0/3
70											,				,				
) Q							·				4		-				,		
Ç																1		,	
100				Ŀ							,								
110											-								-
120																			
130											ı				,				
140									:			•			4				
150	'										,								
160														,					
170																			
180									Γ		·								
) 																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	RECO	RECONNAISSANCE	SANCE		,													
	SEGMENT 3:		MAIS	SANCE	RECONNAISSANCE, GENERA	ERAL		,				MET	METHOD						
	1	i	FLIGHT	' <b>t</b> +			SUPI	SUPPORT			Z	MISSION		•			TOTAL CONCURRENT	RENT	
CUM.	FUNCTION	>	A.	O	P.	FUNCTION	Þ	A	O	а	FUNCTION	Λ	Ą	ပ	Ъ	Λ	A	ပ	Ĉų
10	29	2/0		3/3	4/0											2/0-	3/3	4/0	
20		ļ		9/0	4/0	33	2/2	2/2	2/2					·		2/7	2/2	2/6	0/4
30		0/5		2/0	0/7		5/0	4/4	9/0							0/5		5/0	4/0
40	18	1/0		3/0	0/7	-							,			1/0		3/0	4/0
-50		9/0		0/5	0/5											9/0		0/5	4/0
09		9/0		9/0	5/0			,		,	,					9/0		9/0	5/0
70		2/0		2/0	0/7	90	2/0		2/0					. ,		2/0		4/0	4/0
80	54	2/0		0/2	4/4						,					2/0		0/2	4/4
90		2/0		0/2	7/7	33		2/2	2/2							2/0	2/2	2/4	4/4
100		2/0		0/2	7/7						45	0/5		0/4	0/7	2/5		9/0	4/11
110		2/0		0/2	4/4						-	0/5		0/2		2/5		7/0	4/4
120		2/0		0/2	4/4		,				•	0/5		0/2		2/5		0/4	4/4
130	25	2/0		2/0	4/0						,					2/0		2/0	4/0
140		2/0		2/0	4/0	42	0/5		0/2	0/1						2/5		2/2	4/1
150		2/0		2/0	0/7		9/2		0/4	0/7						2/5		2/4	4/7
160		2/0		2/0	0/4		0/5		9/0	7/0				· ·		2/5	,	2/4	4/7
170		2/0		2/0	0/7		0/5		0/4	0/7	,					2/5		2/4	4/7
180		2/0		2/0	0/7		0/5		073	0/1				_		2/5		2/3	4/1
													٠						

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

SEGMENT 3: RECONNAISSANCE, GENERAL (Cont.) RECONNAISSANCE PHASE

METHOD

	ρ <sub>i</sub>	4/1	4/7	4/7	4/7	4/7	4/7	4/7	4/7	4/7	4/1	4/1	4/4	6/4	9/4	4/8	8/4	4/0	
ENT	0	2/3	2/5		2/4	2/4	2/4	2/4	2/4	2/4	2/2	2/6	0/2	8/0	9/0	0/5	9/0	3/3	9
TOTAL CONCURRENT	4					,					0/1	0/1					-		
J	۸	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/0	2/6	2/5	2/1	2/4	2/0	2 /0
	Ы										,					7/0.	9/0		
	U															0/3	0/4		
	4		-						,				,				·		
MISSION	Δ							_								0/1	0/4		
×	FUNCTION							_			·			, ,					
. '	a.	0/1	2/0	2/0	2/0	0/7	2/0	7/0	2/0	2/0	0/1	0/1		0/5	0/2				
	ņ	٥/3	0/5	0/4	9/0	0/4	0/4	0/4	0/4	0/4	0/2	9/0	·	9/0	9/0				
SUPPORT	A										0/1	0/1			,			-	
SUP	>	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5		9/0	0/5				_
,	FUNCTION	35		,						,	51			. 55					, '
	d.	4/0	0/4	4/0	4/0	4/0	6/7	4/0	4/0	4/0	4/0	0/7	4/4	4/4	4/4	4/4	4/4	4/0	4/0
	ပ	2/0	2/0-	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	0/2	0/2	0/2	0/2	3/3	5/0
FLIGHT	A											•						1	-
	V.	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	5/0
	FUNCTION		1										54				,	29	1
	CUM. SECS.	150	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS -- TWO CREWMEMBERS

ı	PHASE	RECO	RECONNAISSANCE	SANCE			ļ												
	SEGMENT 4:	RECOI	RD SI	RECORD SIGHTINGS	GS						1	METHOD	[						
			FLIGHT	H			SUPPORT	ORT			<b>\(\overline{\ov</b>	MISSION			,	,	TOTAL	ENT	
CUM.	FUNCTION	Þ	4	U	д	FUNCTION	>	4	S	d	FUNCTION	>	A	v	Ь	V	A	ပ	A.
-10	25	2/0		2/0	4/0	90	5/0		2/0	,	_					2/0		4/0	4/0
20	54	2/0		0/2	4/4							,				2/0		0/2	4/4
30		2/0		1/0	4/4	,						,		,		2/0		1/0	4/4
7 04		2/0		0/2	4/4	56	9/0		9/0	0/5			. 1			2/6		8/0	6/4
20		2/0		0/2	4/4		0/5		0/4	0/2						2/5		9/0	9/4
		2/0		0/2	4/4		0/5		9/0	9/0						2/5		9/0	8/7
<b>1.</b> 0		2/0		0/2	4/4						45	0/5		0/4	0/7	2/5		9/0	4/11
80		2/0	ī	0/2	7/7				,			0/5		-0/2		2/5		9/6	4/4
		2/0		0/2	7/7	,	·					0/5		0/2		2/5		0/4	4/4
100		2/0		0/2	4/4						01	0/4		0/1	0/4	2/4		0/3	8/7
110		2/0		0/2	7/7							0/5		7/0	0/1	2/5		9/0	4/5
120	31	1/0		2/0												1/0		2/0	
130		2/0		17/0	4/0					ļ*						2/0		1,0	4/0
140	25	2/0		2/0	0/7											2/0		2/0	4/0
150		2/0		2/0	4/0	42	0/5		9/0	0/7		,				2/5		2/2	4/1
160		2/0		2/0	4/0		0/5		0/4	2/0						2/5		2/4	4/1
170		2/0		2/0	4/0		0/5		0/4	0/7						2/5		2/4	4/7
180	,	2/0		12/0	0/7		0/5	_	0/3	0/1/				_		2/5		2/3	4/1
												. 1							

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

FUNCTION   V   A   C   P   FUNCTION   V   A   C   P   FUNCTION   V   A   C   P   V   V   V   V   V   V   V   V   V	H	PHASE	RECO	RECONNAISSANCE	SANCE															
V         A         C         P         FUNCTION         V         A         C         P           2/0         1/0         4/0         06         5/0         2/0         0/2         0/1         0/2         P           2/0         1/0         4/0         07         0/5         0/5         0/2         0/1         0/1         0/4         0/2         0/2         0/1         0/2         0/4         0/2 </td <td>SEGME</td> <td></td> <td>TACT</td> <td>ICAL</td> <td>MOVEM</td> <td>ENT</td> <td>,</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>MET</td> <td>НОО</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	SEGME		TACT	ICAL	MOVEM	ENT	,						MET	НОО						
V         A         C         P         FUNCTION         V         A         C         P         FUNCTION         V         A         C         P         FUNCTION         V         A         C         P         FUNCTION         V         A         C         P			••	FLICH	H		,	SUPI	ORT			Σ	NOISSI	١,	•			TOTAL CONCURRENT	L RENT	
25         2/0         1/0         4/0         06         5/0         2/0         0/5         0/6         0/5         0/6	E	NCTION	P	<b>A</b>	O	a	FUNCTION	>	A	υ	- P	FUNCTION	>	V	v	А	^	A	၁	Ь
54         2/0         1/0         4/0         0/5         0/5         0/5         0/2         0/1		25	2/0		1/0	4/0	90	2/0		2/0							1/0		3/0	0/7
54         2/0         1/0         4/4         9         9         32         0/1         0/3         0/4           2/0         0/2         4/4         0         0         0/2         4/4         0         0         0/1         0/3         0/4         0/			2/0		1/0	4/0	07	0/5	,	5/0	0/2-						2/5		1/5	4/2
2/0         0/2         4/4         0/5         4/4         0/1 <td>L_</td> <td>54</td> <td>2/0</td> <td></td> <td>1/0</td> <td>4/4</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>,</td> <td></td> <td></td> <td></td> <td>2/0</td> <td></td> <td>1/0</td> <td>4/4</td>	L_	54	2/0		1/0	4/4	-						,				2/0		1/0	4/4
2/0         0/2         4/4         0/5         4/4         0/5         0/5         0/4 <td></td> <td></td> <td>2/0</td> <td></td> <td>0/2</td> <td>4/4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>32</td> <td>0/1</td> <td></td> <td></td> <td>0/4</td> <td>2/1</td> <td></td> <td>0/5</td> <td>4/8</td>			2/0		0/2	4/4						32	0/1			0/4	2/1		0/5	4/8
2/0         0/2         4/4         49         0/5         0/1         0/4         0/3         0/4         0/4         0/3         0/4         0/4         0/3         0/4         0/4         0/3         0/4         0/4         0/4         0/3         0/4         0/4         0/4         0/3         0/4	<u></u>		2/0		0/2	4/4							0/1			9/0	2/1		0/5	4/8
29         2/0         3/3         4/4         49         0/5         0/1         0/4         0/3         0/3         0/4         0/3         0/4         0/4         0/5         0/1         0/4         0/5         0/4         0/5         0/4         0/5         0/1         0/5         0/1         0/3         0/4	<u> </u>		2/0		0/2	4/4							0/4			0/4	2/4		9/0	4/8
29         2/0         3/3         4/4         4/0         9         9         9/1         9/3         9/4	<u> </u>		2/0		0/2	4/4	67	0/5	0/1	9/0	0/3						2/5	0/1	9/0	4/7
30         0/5         4/0         4/0         0         32         0/1         0/3         0/4         0/4         0/4         0/4         0/3         0/4         0/3         0/4         0/3         0/4	<u>L</u>	29	2/0		3/3	4/4		·									2/0		3/3	0/5
0/5         0/6         4/0         0         0         0/1         0/2			0/5		9/0	0/7				,		32	0/1		0/3	0/4	9/0		7/0	4/4
30         2/0         4/0         2         2/2         4/0         2         2/2	<u> </u>		0/5		0/5	4/0						,	0/1		0/3	0/4	9/0		0/8	4/4
30         2/0         4/0         33         2/2         2/2         2/2         6         4/0         33         2/2         2/2         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6	<u> </u>		0/5		0/5	4/0							7/0		0/4	0/4	6/0		6/0	4/4
54         2/0         1/0         4/4         33         2/2         2/2         2/2         0/1         0/1         0/3         0/4           2/0         0/2         4/4         0         0         0         0/1         0/1         0/1         0/1         0/1         0/4           2/0         0/2         4/4         0	Ļ.,	30	2/0		2/0	4/0					·						2/0		2/0	4/0
2/0         0/2         4/4         2         0/1         0/2         0/1         0/3         0/4         0/4         0/3         0/4         0/3         0/4         0/4         0/4         0/3         0/4	i	54	2/0		1/0	7/7	33	2/2	2/2	2/2			·				4/2	2/2	3/2	4/4
2/0       0/2       4/4       0       0/1       0/1       0/1       0/2       0/4	L.		2/0		0/2	4/4						32	0/1		0/3	0/4	2/1	-	0/5	4/8
2/0     0/2     4/4     0/5     0/1     0/4 <td><u> </u></td> <td></td> <td>2/0</td> <td></td> <td>0/2</td> <td>4/4</td> <td>,</td> <td></td> <td>,</td> <td></td> <td></td> <td></td> <td>0/1</td> <td></td> <td>0/3</td> <td>0/4</td> <td>2/1</td> <td></td> <td>0/5</td> <td>4/8</td>	<u> </u>		2/0		0/2	4/4	,		,				0/1		0/3	0/4	2/1		0/5	4/8
0/2 4/4 0/5 0/1 0/4 0/3	<u> </u>		2/0		0/2	4/4			-		, .		7/0		9/0	0/4	2/4		9/0	4/8
	<u> </u>		2/0		0/2	4/4		0/5	0/1	0/4	0/3						2/5	0/1	9/0	4/7
	L													_						

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

ı			d —	0/7	4/1	4/7	4/7	4/7	4/7	4/7	4/7	4/7	4/7	4/7	4/7	4/7	4/7	4/1	4/1		
		L RENT	C	6/4	2/3	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/6	2/6		
		- TOTAL CONCURRENT	A															0/1	0/1		
			Λ	1/0	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5	2/5		
	TAL	1	Ъ		0/1	7/0	7/0	0/7	7/0	0/7	7/0	0/7	2/0	0/7	0/7	0/7	0/7	0/1	0/1		
	METHOD DIGITAL	•	С		0/3	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	9/0	9/0		
	THOD	z	A			,							-					0/1	0/1		
.	ME	MISSION	V		0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	-0/5	0/5	0/5		
		W .	FUNCTION	-	35		,											51			
		1	Ъ																		
			C	2/0					٠		•										<u> </u>
		SUPPORT	A						·												_
		SUPI	Λ	2/0					,												
			FUNCTION	90																	
	, <u> </u>		Ь	4/0	4/0	0/5	4/0	4/0	4/0	4/0	4/0	0/7	4/0	4/0	4/0	4/0	4/0	4/0	4/0	1	-
ANCE	EPORT		C	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0		-
NAISS	MIT R	FLIGHT	A			7		1						-	1	1	_			1	-
RECONNAISSANCE	TRANS	, (III, _	Λ	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	1	
PHASE	SECMENT 6: TRANSMIT REPORT		FUNCTION	25				'		·											
<b>Δ</b> .	S		CUM. SECS.	10	20	30	07	20	09 H-	2	80	06	100	110	120	130	140	150	160	170	180

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

TARGET SERVICE

		Д.	4/3	4/0	4/0	4/0	4/0	4/4	4/4	4/9	8/7	9/7	4/11	4/4	4/4	4/8	4/8	4/8	,	
.	L RENT	ပ	3/7	0/4	0/5	0/7	2/0	2	2/4	9/0	9/0	9/0	9/0	7/0	7/0	0/8	0/8	9/0		
	TOTAL	A	0/1						2/2								1			
		Λ	2/5	5/0	5/0	2/0	2/0	2/0	4/2	2/6	2/5	2/5	2/5	2/5	2/5	2/4	2/6	2/5		
METHOD AUTO SEARCH		Да				•							0/7			0/4	0/4	- 7/0		
AUTO	,	ာ										·	0,74	0/2	0/2	9/0	9/0	0/4	7	-
원 연	,	A						,					,							
MET	MISSION	Δ											0/5	0/5	0/5	0/4	9/0	0/5		
	Œ	FUNCTION								,	-	,	45			16	26	01		
		Ъ	0/3							0/5	9/0	0/2								
	•	ပ	9/0			2/0	,		2/2	0/4	0/4	9/0								
	SUPPORT	A	0/1						2/2											
	SUP	'n	0/5			9/9			2/2	9/0	0/5	0/5			,			_		
·		FUNCTION	67			90			33	56									,	
		P.	7/p	0/7	0/4	0/5	4/0	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4		
NO		O	3/3	4/0	0/5	2/0	2/0	1/0	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2		
ISITI	FLIGHT	∢,																		
ACQU	,	>	2/0	5,0	5/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0		
SEGMENT 7: ACQUISITION		FUNCTION	29			25		54				,								
Ś		CUM.	10	20	30	70	50	09	20	080	06	00.	011	120	130	140	150	160	170	180

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	SEGMENT 8:	ACQUISITION	SITI	NO	`							ME	THOD	FROM	METHOD FROM LASER CUEING	CUEIN	ဌ		
•	•	, p4	FLIGHT	. 1			SUP	SUPPORT		,	<b>Σ</b>	MISSION	z	•			TOTAL	TOTAL CONCURRENT	
CUM. FUN	FUNCTION	Λ	Α.	ບ່	Q,	FUNCTION	Δ	A	ပ	a,	FUNCTION	>	V	ပ	дı	Δ	A	ပ	а
	25	2/0		1/0	0/4	90	5/0		2/0							2/0		3/0	4/0
20		2/0		2/0	4/0											2/0		2/0	4/0
30		2/0		2/0	4/0			,			38		0/3	0/4	0/3	2/0	0/3	2/4	4/3
40	54	2/0		1/0	4/4	,						0/1		0/3	0/4	2/1		2/3	4/8
50		2/0		1/0	7/7	·		,	,				0/3	0/4	,	2/0	0/3	1/4	4/4
	,	2/0		1/0	4/4							0/2	1	0/2	,	2/2		1/2	4/4
70		2/0		1/0	4/4							0/4		0/4	0/4	2/4		1/4	4/8
80		2/0		1/0	4/4	67	0/5		0/4	0/3				,		2/5		.1/4.	4/7
06					,									_					
100											1			·					
110							,								,		,		
120				٠	-	7				·									
130										,	,								
140																			
150							·							_					
160		·											,						
170											·					-			
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

TARGET SERVICE

PHASE

,	SEGMENT 9: ADJUSTMENTS, AREA WEAPONS	ADJI	USTME	TS, A	IREA W	TEAPONS				·		MET	. 0H 0H 1.	METHOD DIGITAL	AL				
			FLIGHT	H	1		SUPI	SUPPORT		,	Œ	MISŠION		١.			TOTAL CONCURRENT	VL KRENT	
CUM.	FUNCTION	>	₩ W	U	Δ.	FUNCTION	>	A	၁	tr.	FUNCTION	۸	A	ِ ن	P	۸	Ą	S	Q.
10	25	2,0	igert	2/0	0,7	90	5/0		2/0						,	7/0		4/0	4/0
20		2/0		2/0	+-						-				·	2/0		2/0	4/0
30		2/0	_	2/0	╅	39	0/5	0/1	0/3	0/1	-					2/5	0/1	2/3	4/1
) V	75	2,0	lacksquare	0/2	4/4								,			2/0		0/2	4/4
} £		2/0	-	0/2	┼						97	0/3		0/3	0/4	2/3		0/5	4/8
		2/0		0/2	+							0/5	-	0/2	0/4	2/5		0/4	4/8
S		2 0	<u> </u>	0/2	+						01	0/5		0/1	0/4	2/5		0/3	4/8
	31	2/0	  -	2/0	┼─											2/0		2/0	4/0
06		2/0		2/0	┼	42	0/5		0/4	1/0	,					2/5		2/4	4/7
100		2/0	_	2/0	—		0/5		6/0	0/1	,		·		,	2/5		2/3	4/1
110		2/0	_	2/0	ļ	51	0/5	0/1	9/0	0/1						2/5	0/1	2/6	4/1
120		2/0	_	2/0	0/4		0/5	0/1	9/0	0/1	ŀ					2/5	0/1	2/6	4/1
130						,													
140		<u> </u>			·								,						
150			_	_	_														-
160		_	-	_	_						1								
170		_		_	_		-									,			
		1	lacksquare	-	<u> </u>		Ŀ												,
180							1												

SUPMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

SEGMENT 10:					-													
- 1	ADJU	STMEN	TS, A	IREA 1	ADJUSTMENTS, AREA WEAPONS	·		,			ME	METHOD	VOICE	, 61			,	1
	i	#110 # #E				10113	Facaaria	,		· >	MTGCTON	9				TOTAL	L	í
•		י מאַזיין.		•	,	1100	TWO			,	0.000		-					
FUNCTION	>	Ą	υ	Д	FUNCTION	Λ	A	၁	P	FUNCTION	Λ	V	၁	Ь	Λ	¥	ပ	۵.
25 2	2/0		1/0	4/0	90	5/0		2/0		,					0/2		3/0	4/0
2	2/0		2/0	0/7											2/0		2/0	4/0
2	2/0		2/0	0/7	41		0/3	0/4	0/3					·	2/0	0/3	2/4	4/3
2	2/0		2/0	0/4			0/3	9/0	0/3						2/0	0/3	2/4	4/3
54 2	2/0		1/0	4/4						46	0/3		0/3	0/4	2/3		1/3	4/8
2	2/0		0/2	4/4				,			0/5		0/2	0/4	2/5		0/4	8/4
2	2/0.		0/2	4/4						57	0/4		0/3	0/1	2/4		0/5	4/5
2	2/0		0/2	4/4					·		0/4		0/1	0/4	2/4		0/3	4/8
2	2/0		0/2	4/4							0/5		0/4	0/4	2/5		9/0	4/8
31 2	2/0		2/0	4/0				,			/				2/0		2/0	4/0
2	2/0	-	1/0	0/7											2/0		1/0	4/0
	-		'		67	0/5		7/0	0/3						0/5		0/4	0/3
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	$\vdash$	<u> </u>							,			٠,						

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

TARGET SERVICE

PHASE -

S	SEGMENT 11: DESIGNATE FOR PGM	DES	IGNAT	E FOR	PGM							ME	METHOD				•		
	•											./	1 .		,		1401		
	,	,	FLIGHT	ا ب	٠, .		SUP	SUPPORT		.	£	MISSION	, 7				CONCURRENT	RENT	
SECS.	FUNCTION	۸	- A	၁	ď	FUNCTION	Λ	A	Ċ	Р	FUNCT ION	Λ	4	ပ	a	Λ	4	ပ	2
10	54	2/0		0/2	4/4	-										2/0		0/2	4/4
20		2/0		0/2	4/4	33	2/2	2/2	2/2							7/7	2/2	7/7	7/7
30		2/0		0/2	4/4					,	87	0/4		0/3	0/4	7/7	į	0/5	8/7
70		2/0		0/2	4/4	70	0/2	0/1	0/3	0/1				·		2/2	0/1	0/5	4/5
20	·	2/0		0/2	4/4		1/0		7/0			. ,				2/7		9/0	4/4
09	,	2/0		0/2	4/4		1/0		7/0		,		,			2/7		9/0	4/4
20		2/0		0/2	4/4	.,	0/2	0/1	0/3	-1/0		٠				2/2	0/1	5/0	4/5
80	·	2/0		0/2	4/4	39	0/5	0/1	0/3	0/1						2/5	0/1	0/5	4/5
06		2/0		0/2	7/7	·	0/5	0/1	0/2					1		2/5	0/1	0/4	4/4
100		2/0		0/2	7/7			7			13	0/5		0/2	0/4	2/5		9/0	8/4
110		2/0		0/2	4/4			1				0/5		0/2	0/1	2//5		0/4	4/5
120		2/0		0/2	4/4							0/5		0/2	0/1	2/5		7/0	4/5
130	12	2/0		2/0	0/4	-		7		•	,					2/0		2/0	4/0
140		2/0		0/9	0/7									,	•	2/0		0/9	6/0
150						·					,			'					
160								, .											•
170																-			
180	-      -	-	-	_	-	_	_						<u> </u>						

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	TAR	GET S	TARGET SERVICE	<u>121</u>								1						
	SEGMENT 12:		ENGAGEMENT,		AIR-TO-G	-GROUND				·		MEJ	THOD	AUTO	NOMOUS	METHOD AUTONOMOUS, LOAL			1
			FLIGHT	£		,	SUPI	SUPPORT			<b>.</b>	MISSION	,	•		ì	TOTAL	AL RRENT	'
CUM.	FUNCTION	>	<b>▼</b>	U	E.	FUNCTION	>	4	ပ	ď	FUNCTION	Δ	A	ပ	Ь	Λ	А	၁	Ы
10	54	2/0	_	0/2	4/4							,				2/0		0/2	4/4
20		2/0		0/2	4/4	33	2/2	2/2	2/2		î					4/2	2/2	2/4	4/4
30		2/0		0/2	4/4						48	9/0		0/3	0/4	2/4		0/5	8/4
707		2/0		0/2	4/4							9/0		0/3	0/4	2/4		0/5	4/8
50		2/0		0/2.	4/4		;				01	0/5		0/4		2/5		9/0	4/4
09		2/0		0/2	4/4						37	0/5	-	0/4	0/1	2/5		9/0	4/5
ı		2/0		0/2	4/4							5/0		0/2		2/5		0/4	4/4
. 08	03	7/0		5/0											1	4/0		2/0	4/0
06		2/0		1/0					,							2,0		1/0	4/0
100	53	1,0		2/0	4/0		,								·	1/0		2/0	4/0
110		2/0		1/0	4/0							,				2/0		1/0	4/0
120		2/0		2/0	4/0	13	0/5		0/2	0/4					•	2/5		2/2	4/4
130		2/0		2/0	4/0		0/5	,	0/2	0/1	23	0/5		9/0	0/4	2/10		2/8	4/5
140		2/0		2/0	4/0		0/5		0/2	0/1		0/5	0/1	0/2	0/1	2/10	0/1	2/4	4/2
150		2/0		2/0	4/0		0/5		0/2	0/1		,	'			2/5	,	2/2	4/1
160		2/0		2/0	4/0	,	0/5		0/2	0/1						2/5		2/2	4/1
170	12	2/0		5/0	4/0							·		,		2/0		5/0	4/0
180		2/0		0/9	0/7											2/0		0/9	4/0
													,	,					

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS -- TWO CREWMEMBERS

-		,	2															
CECUENT 13.	ı	FNCACEMENT	FNCACEMENT, GR	GROUND TARG	TARGET			,			MET	METHOD	AUTON	AUTONOMOUS.	LOBL			1
SEGIENT 13	i .					SUPPORT	ORT	,		X	MISSION		, <b>.</b>		·	TOTAL	NL RENT	
	<u> </u> :	Trough T			FINCTION	>		v	A	FUNCTION	>	4	ပ	а	>	V	ဎ	Ь
SECS. FUNCTION	>   -	4	ٔ د	-	10101	.   5		15	1				<del> </del>		0/7	2/2	3/2	4/4
54	2/0		1/0	4/4	33	7/7	7/7	7/7	+	α,	200		0/3	0/4	2/4		1/3	4/8
	2/0		1/0	7/7			1	T		9	7/0		┿	0/4	2/4		7/0	4/8
	2/0		0/2	4/4				1	T		9/5	5	╄	0/1	2/5	0/1	8/0	4/5
	2/0		0/2	4/4				1		3.7	2,0	,	7/0	0/1	4/5		5/4	4/1
50 03	4/0		2/0	0/4						,,	3		0/4	0/1	4/5		5/4	1/5
	4/0		2/0	4/0				:	1						2/4		2/1	7/7-
53	2/0		2/0	4/0	13	0/4		0/1	7/0				15		0,0		2/5	4/1
	2/0		2/0	4/0		0/5		0/2	5	2/	7/0			];	21,7	5	0/6	1,75
	0/7		2/0	4/0		0/5		0/2	0/1	23	0/2	0/2	9/0	0/4	4/10	7	6/7	
	, ,		3,0	0/7		0/5		0/2	0/1						4/5		7/7	4/1
];	3,0		2	<del> </del>											2/0		2/0	4/0
12	0/2			-						-					2/5		-6/2	4/4
120	7/0			-					:						1			
130	-																	
140																	<u> </u>	
	_				,													
) OCT	-									,								
160	-	1	1	1														
170	1							·									;	
- 081			_	_		_	_				_							

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	TAR	TARGET SERVICE	ERVIC	Ħ				•				,				·		
,	SEGMENT 14:	1	ENGAGEMENT,	NT, G	GROUND	TARGET						MET	дон.	REMOT	METHOD REMOTE DESIGNATION	IGNATI	NO		
	,		FLIGHT	E			SUPI	SUPPORT			<b>Σ</b>	MISSION	, <del>,</del>	•	1		TOTAL	AL RRENT	
CUM.	FUNCTION	Þ	⋖	o	<u></u>	FUNCTION	Δ	Ą	ပ	Ы	FUNCTION	Λ	Ą	၁	Ъ	Λ	Ą	ĵ	Ы
10	25	2/0		2/0	4/0	41		0/3	0/4	0/3						2/0	0/3	2/4	4/3
20		2/0		2/0	6/0	4		0/3	7/0							2/0	0/3	2/4	4/0
30		2/0		2/0	4/0			0/3	7/0							2/0	0/3	2/4	4/0
07		2/0		2/0	0/4		0/3	,	7/0	9/0			,			2/3		2/4	9/4
50		2/0		2/0	7/0	-		0/3	0/4	0/3						2/0	0/3	2/4	4/3
		2/0		2/0	4/0		0/5		0/2	0/1						2/5		2/2	4/1
. 2 -19		2/0		2/0	4/0		0/5	,	7/0	2/0	į.					2/5		2/4	4/7
80		2/0		2/0	4/0		0/5	,	5/0	0/7						2/5		2/4	4/7
06		2/0		2/0	4/0		0/5		0/4	2/0						2/5	,	2/4	4/7
100	į	2/0		2/0	╄		0/5		0/4	2/0			-	,		2/5		2/4	4/7
110		2/0		2/0	ļ	07	0/5		0/5	0/2						2/5		2/5	4/2
120	29	5/5		5/0	4/0											5/5		5/0	4/0
130		5/5		5/0	4/0											5/5		5/0	4/0
140	25	2/0		2/0	4/0	55	9/0		9/0	5/0			, '			2/6		2/6	4/5
150		2/0		2/0	4/0		9/2		7/0	0/2						2/5		2/4	4/2
160		2/0		2/0	4/0	90			0/1							2/0		3/0	0/7
170		2/0		2/0	0/4		2/0	2/0			,					1/0		4/0	4/0
180		2/0		2/0	0/7						. 37	0/5		0/4	0/1	2/5		2/4	4/1

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO GREWMEMBERS

	PHASE	TAR	BET S	TARGET SERVICE	ы														
	SEGMENT 14: ENCAGEMENT, GROUND	ENG/	1GEME	NT, G	ROUNI	TARGET (Cont.)	nt.)				,,	MET	METHOD	REMO	REMOTE DESIGNATION	GNATIC	N		
			FLIGHT	ĘH ·			SUPPORT	ORT	•	٠.	EM.	MISSION	_			0	TOTAL	ENT	
CUM.	FUNCTION	Δ	A	ပ	Р	FUNCTION	Α	A	ပ	ы	FUNCTION	Δ	V	یٔ	P	Λ .	Ą	၁	ы
190		2/0	,	2/0	4/0							0/5		9/0	0/1 -	2/5		2/4	4/1
200		2/0		2/0	4/0	50		0/3	9/0	0/3				·		2/0	0/3	2/4	4/3
210		2/0		2/0	4/0	,		6/3	9/0	0/3	·	-	1			2/0	0/3	2/4	4/3
220		2/0		2/0	4/0			0/3	. 7/0	0/3						2/0	0/3	2/4	4/3
230		2/0		2/0	4/0			0/3	9/0	0/3		·				2/0	0/3	2/4	4/3
240	53	2/0		2/0	7/0											2/0	,	2/0	0 7
250		0/5	٠.	2/0	4/0	,										4/0		2/0	4/0
260		2/0		1/0	4/0	•				,					,	2/0		1/0	0/7
270		2/0		1/0	4/0						23	0/5	0/1	9/0	0/4	2/5.	0/1	1/6	4/4
280	,	2/0		1/0	0/7	67		0/5	9/0	0/3			,			2/0	0/5	1/4	4/3
290	31	2/0		2/0	4/0	-			·							2/0	,	2/0	4/0
300		2/0		2/0	4/0								,		·	2/0		2/0	7/5
310			i.								, ,								
320																			
330										•					•				
340			,																
350																			
360		_	_	_	_	_		_		-			-						

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

			4,	4,	4	7	4,	7	4	7	4,	7	7	4	4	4	7	7	4	4
	TOTAL CONCURRENT	<u>ي</u>	0/4	1/0	4/0	1/4	1/4	1/4	1/4	1/4	0/4	0/4	0/5	9/0	1/0	1/3	5/0	1/0	2/0	2/0
ER	TOTAL	V V				0/3	0/3	0/3		0/3										1
METHOD CANNON FIRE, HOVER		Δ	5/5	2/0	0/9	2/0	2/0	2/0	2/5	2/0	5/5	5/5	9/0	9/0	2/2	2/2	4/0	2/0	2/0	4/0
ON FIR		Ь														1/0				
CANN		ပ														0/3				
409 409		A				,													•	
MET	MISSION	Λ														0/5			,	
	M	FUNCTION						,	,				,		•	36	ı			
		ά·			4/0	0/3			9/0	0/3					·					
,		၁			2/0	0/4	9/0	0/4	0/4	0/4					٠					
	ORT	A		,		0/3	0/3	0/3		0/3	,									_
	SUPPORT	۸			5/0				0/5											-
ARGETS	,	FUNCTION			90	. 41					,									
H		Ь	4/0	4/0		4/0	4/0	4/0	4/0	0/7	4/0	4/0	4/0	4/0	4/0	4/0	4/0	0/4	4/0	4/0
T, S(		U	0/4	1/0	2/0	1/0	1/0	1/0	1/0	1/0	0/4	0/4	0/5	9/0	1/0	1/0	5/0	1/0	2/0	2/0
GEME	FLIGHT	A						,						·						-
ENG/		>	5/5	2/0	1/0	2/0	2/0	2/0	2/0	2/0	5/5	5/5	9/0	9/0	2/2	2/2	4/0	2/0	2/0	4/0
SEGMENT 15: ENCAGEMENT, SOFT		FUNCTION	29	25			,				29		18				03		.53	_
. ,		CUM. SECS.	10	20	30	. 07	20	09 H-	21	80	06	100	110	120	130	140	150	160	170	180
1																				

SUPPIARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

		a	6/7	4/4	4/1	4/4	0/7	6/0			·									
	L RENT	S	1/0	1/4	1/2	1/2	2/0	0/9				,						,		
ER	TOTAL CONCURRENT	<b>V</b>							-											
METHOD CANNON FIRE, HOVER		>	2/0	2/5	2/3	2/5	2/0	2/0												
ON FIR		ь		0/4	0/1	0/4					,					ı	,			
CANN		ပ		0/4	0/2	0/2								-					. ,	
HOD	/**	A																	·	
ME	MISSION	Λ		0/5	0/3	0/5				-					-	Ţ				
		FUNCTION		01	22	-						٠						,		
		Ы											·					,		
	•	ပ		-																
	SUPPORT	V						,												_
nt.)	SUP	Þ																		
RGETS (Co	ı	FUNCTION														-				_
FT TA		Ъ	4/0	4/0	4/0	4/0	4/0	0/7		·										-
VT, S(	<u>F-a</u>	C	1/0	0/1	1/0	1/0	5/0	0/9												-
AGEME	FLIGHT	A																		-
ENG	-	Λ	2/0	2/0	2/0	2/0	2/0	2/0				·	,							
SEGMENT 15: ENGAGEMENT, SOFT TARGETS (Cont.)		FUNCTION	53			·	12						,							-
· .		CUM. SECS.	190	200	210	220	230	-H 240	72 22	260	270	280	290	300	310	320	330	340	350	360

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	1	TNT	C P	0/7 0/7	2/4 4/3	2/4 4/0-	2/4 4/6	2/4 4/3	2/4 4/7	2/4- 4/7	2/4 4/7	2/3 4/1	2/5 4/2	3/3 4/0	0/4	5/0 4/0	0/6 0/5	0/9 9/0	2/0 4/0	2/4 4/3	2/4 4/3
		TOTAL CONCURRENT	Α .	7 -	0/3 2,	0/3 2	2	0/3 2	- 2	7	7	2	2	3		2			7	0/3 2	0/2 - 2
		Ö		0	2/0 0,	2/0 0	2/5	2/0 . 0	2/5	2/5	2/5	2/5	2/5	2/0	5/5	5/5	9/0	9/0	2/0	2/0 0	
	RECT	,	Λ	1/0	2,4	2/	2/	2,	2,	2,	2,	2,	2,	2,	2	5	0	0	2	2	_
	FFAR, DIRECT	1	Ь				_		_			-		_							
	1		0											_	_						
	METHOD	NO	¥																		:
	, ,	MISSION	>									·		_		,					
,			FUNCTION						'				•				•		•	,	
			Ъ		0/3		9/0	0/3	0/7	2/0	2/0	0/1	0/2							0/3	
		,	ပ	2/0	10/4	0/4	0/4	0/4	0/4	0/4	7/0	0/3	9/2							0/4	
		SUPPORT	A .		6/0	0/3		0/3												0/3	
		SUP	Λ	5/0			0/5		0/5	0/5	0/5	0/5	0/5		,						
	RGETS		FUNCTION	90	41				42				07							50	
	SOFT TARGETS		۵,	0/7	4/0	4/0	0/7	0/7	0/7	4/0	0/7	0/4	4/0	0/4		0/4	0/5	4/0	0/4	0/4	
TARGET SERVICE	T, S0	_	U,	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	3/3	0/4	5/0	9/0	9/0	2/0	2/0	
ET SE	GEMEN	FLIGHT	A																		r
TARG	ENGAGEMENT,		Δ	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	5/5	5/5	9/0	9/0	2/0	2/0	<b>†</b>
PHASE	SEGMENT 16:		FUNCTION	25										29			18		25		
P4	S		CUM.	10	20	30	07	50		-23	80	06	100	110	120	130	140	150	160	170	

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS -- TWO CREWMENBERS

SEGMENT 16:																•		
	- 1	ENGAGEMENT,		FT T4	SOFT TARGETS (Cont.)	<u>(†</u>			,		ME	THOD	FFAR,	METHOD FFAR, DIRECT	H			
		FLIGHT	=		,	SUP	SUPPORT		i	. ( <b>)</b>	MISSION					TOTAL CONCURRENT	ENT	
FUNCTION	>	A	ပ	Ы	FUNCTION	Δ	Y .	υ	Ъ	FUNCTION	Λ	A	၁	P	Ŋ.	- Y	ပ	ы
,	2/0		2/0	4/0	50		0/3	9/0						'	2/0	0/3	2/4	4/0
	2/0		2/0	4/0						36	0/5		0/3	0/1	2/5		2/3	4/1
'	0/7		5/0	0/4							,			•	4/0		5/0	0/7
-	4/0		9/9	0/7		·				•		1			4/0		2/0	4/0
53	2/0		2/0	0/7											2/0		2/0	4/0
	2/0		2/0	4/0	,										2/0		2/0	0/7
	4/0		2/0	0/7											0/4		2/0	4/0
,	0/7		2/0	0/5		·									4/0		2/0	4/0
·	7/0	,	2/0	0/5		·			,					,	4/0		2/0	0/7
12	2/0		5/0	0/4											2/0		5/0	4/0
	2/0		0/9	0/7				7							2/0		0/9	0/4
300									,									
											,							
•									-			_			,			
			'										,					
														-	,			
																,		
		[	Γ		-													

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	TARG	ET SI	TARGET SERVICE	ы					·									
	CECMENT 17. HANDOFF GROUND TARGET	- CNVH	07.7	GROIL	YD TAE	\GET						MET	HOD	METHOD DIGITAL	ral				
	- CT TWITTEN						,								•		TOTAL	Į.	1
		[Z4	FLIGHT	Ħ	F		SUPPORT	ORT		'	M	MISSION					CONCURRENT	RENT	,
CUM.	FUNCTION	, >	4	ပ	Δi,	FUNCTION	>	A	ပ	ы	FUNCTION	Λ	A	ပ	ď	Λ	Ą	ပ	а
10	54	2/0		0/2	7/7	33	2/2	2/2	2/2							4/2	2/2	2/4	4/4
202		2/0		0/2	4/4						01	0/5		0/4	0/4	2/5		9/0	8/7
9 00	31	2/0		2/0	0/7	. 42.	0/5	7	0/4	7/0						2/5		2/4	4/7
07		2/0	·	2/0	4/0		0/5	,	7/0	7/0	,			,		2/5		2/4	4/7
} <u>'</u>		2/0		2/0	4/0		0/5		0/4	2/0						2/5		2/4	4/7
3		2/0		2/0	4/0		0/5		0/4	0/7			,			2/5		2/4	4/7
8 6		, 0		2/0			0/5		0/4	7/0						2/5		2/4	4/7
2 6		2/2		2/0		51	0/5	0/1	9/0	0/1						2/5	0/1	2/6	4/1
		2 2		2/0			0/5		9/0				,		·	2/5	0/1	2/6	4/0
	,																		
011																			
130																			
000												•	,						
4 .																			1
001																			
200																			
0/1		I																	
180															ļ.				

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	•	<b>a</b>	4/4	8/4	4/8	8/4	4/8		4/0	4/3	4/3	7/0								
	AL RENT	S	2/4	1/3	2/0	0/5	9/0	2/0	1/0	2/4	2/4	2/4								
,	TOTAL	<b>V</b>	2/2							0/3	0/3	0/3								
		>	4/2	2/3	2/4	2/4	2/5	1/0	2/0	2/0	2/0	2/0								<u> </u>
		Ь				0/4	0/4					·			-	<b> </b>	-		<del>                                     </del>	
METHOD VOICE	•	v				0/3	0/4										-			<u> </u>
100 H	•	V												-						<u> </u>
MET	MISSION	>			,	0/4	0/5										_			,
	M	FUNCTION				48	01									,			,	·
.		ď		9/0	0/4					0/3	0/3		·					'		
		ပ	2/2	0/3	0/5					0/4	0/4	0/4								
	SUPPORT	V	2/2							0/3	0/3	0/3						,		
	SUPI	Λ	-2/2	0/3	0/4	•														
CET		FUNCTION	33	27	. ,					50										
D TAR		Ъ	4/4	4/4	4/4	4/4	4/4		4/0	0/7	4/0	4/0		,						_
GROUN	•	ပ	0/2	1/0	0/2	0/2	0/2	2/0	1/0	2/0	2/0	2/0	•							
OFF,	FLIGHT	Α																		_
HAND	<u>,                                    </u>	Λ	2/0	2/0	2/0	2/0	2/0	1/0	2/0	2/0	2/0	2/0							'	
SECMENT 18: HANDOFF, GROUND TARGET	•	FUNCTION	54					31								,				
Ś	1.4	CUM.	10	20	30	07	50	,	2	80	06	100	110	120	130	140	150	160	170	180

1.

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

SEGMENT 19: TARGET HANDOFF

METHOD LASER CUEING

	ы	4/4	4/4	4/8	8/4	4/7	8/1/	4/5	4/4				-						
TOTAL CONCURRENT	၁	0/2	2/2	0/5	0/5	9/0	9/0	0/4	9/0										
TOTAL	Ą		2/2			0/3	0/3		0/3				-						
	Δ	2/0	4/2	2/4	2/4	2/0	2/4	2/2	2/0									,	
	Ъ			0/4	0/4	0/3	0/4	0/1								,			
	С			0/3	0/3	0/4	0/4	0/2	0/4										
	A					0/3	0/3		0/3										
MISSION	Λ			0/4	0/4		0/4	0/2		,									
MI	FUNCTION			48		24						-				,			
	ч																		
i	ပ		2/2											·			•		
SUPPORT	А		2/2								,								
SUP	Λ		2/2											,					
,	FUNCTION	·	33																
	P	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4						,				_
	ပ	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2										
FLIGHT	A																		_
, E4 .	Λ	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0										
	FUNCTION	54																	
	CUM. SECS.	10	20	30	07	20		27	80	06	100	110	120	130	140	150	160	170	180

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS -- TWO CREWMEMBERS

•	PHASE	TAR	TARGET SERVICE	ERVIC	Ħ,														
	SEGMENT 20:	i	HOLDING CHECKS	CHECK	S							ME	METHOD					•	1
	•		FLIGHT	• <b>E</b>			SUP	SUPPORT			<b>X</b>	MISSION	7	*			TOTAL	TOTAL	!
CUM. SECS.	FUNCTION	>	4	U	4	FUNCTION	>	V	ပ	Дı	FUNCTION	>	V	0	d	>	<b>∀</b>	0	4
10	25	2/0		2/0	4/0											2/0		2/0	7
20	,	2/0		2/0	4/0	55	9/0		9/0	0/5						-2/6		2/6	4/5
30		2/0		2/0	4/0		0/5		0/4	0/2						2/5		2/4	4/2
70		2/0		2/0	4/0	05.	0/5	,	9/0							2/5		2/6	4/0
50	1	2/0		2/0	4/0		0/5		0/2	·						2/5		2/2	7/0
09 H-		2/0		2/0	4/0		9/9		9/0							9/8		2/6	4/0
28		2/0		2/0	4/0		0/5		0/2	0/1						2/5		2/2	4/1
. 80		2/0		2/0	4/0		9/9		9/0	•	,					9/8	Í	2/6	4/0
90		2/0		2/0	4/0		9/9		9/0							9/8	·	2/6	4/0
100		2/0		2/0	4/0	80	9/0		9/0	0/1	,					2/6		2/6	4/1
110		2/0		2/0	4/0		9/0		9/0	0/2						2/6		2/6	4/2
120		2/0		2/0	4/0		9/0		9/0	0/2	· —			1	,	2/6		2/6	472
130	·	2/0		2/0	4/0		9/0	·	9/0	0/2					•	2/6		9/7	4/2
140																		•	
150									,						,				
160										1			1						
170		,						·											
180	-	_			_				_				_						

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

•	PHASE	TARG	ET SE	TARGET SERVICE	(e1					·					'   '				
	SEGMENT 21:		OVERWATCH		,							MEJ	METHOD	•		ı			
	•. 		FLIGHT	1			SUP	SUPPORT		!	<b>.</b>	MISSION	,	,			TOTAL	NI. RRENT	
CUM.	FUNCTION	<b> </b>	A	ပ	. a	FUNCTION	Ν	A	ပ	d	FUNCTION	Λ	V	ပ	P	Λ	A	ပ	A.
secs.		5/5		0/4	7/0											5/5	1	0/4	4/0
2 6		5,5		7/0	0/7				-						*	5/5		0/4	4/0
) ' C	25	2,70		0/	7/0	55	9/0		9/0	0/5						2/6		1/6	4/5
2 3		2/0		1/0	4/0		0/5		9/0							2/5	-	1/4	4/0
, r		2/0		1/0	4/0	90	5/0		2/0							7/0		3/0	4/0
3 5	75	2/0		1/0	4/4	33	2/2	2/2	2/2			·				4/2	2/2	3/2	4/4
8 6		2/0		1/0	4/4						- 27	0/3		0/3	0/4	2/3		1/3	4/8
2 6		2,0		1/0	7/7	,						7/0		0/5	0/4	2/4	,	1/5	8/7
8 8		2 2		1 (2	7/7						32	7/0		0,4	0/4	2,'4		1/4	4/8
2		3/0		9 9	7/7	,					60	0/2		0/2	0/4	2/2		1/2	4/8
		2,0		0/1	7/7					,		9/0		9/0	0/2	2/6		1/6	4/6
120		2/0		0/;	4/4	67	0/5	•	0/4	0/3						2/:		1/4	4/7
130								,											
170									:										
, C			•			,													
000						,								-					
091																		1	
0/1																	1		,
180																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

i	ı	<b>1</b>	<b>a</b>	7/0	4/3	7/0	7/0	4/6	- 4/3	4/7	4/7	4/7	4/7	4/2			·				
		TOTAL CONCURRENT	ပ	3/0	1/4	1/4	7,/1	1/4	1/2	1/4	1/4	1/4	7/1	1/5						<u> </u>	_
		TOTAL	A.		0/3	0/3	6/3	0/3	0/3											,	
	.		V	1/0	2/0	2/0	2/0	2/5	2/0	2/5	2/5	2/5	2/5	2/5							,
		١	ч														,		·		
	OICE	•	၂				7														
	METHOD VOICE		. 4				1										-	-			1
	METH	MISSION	>	·													-			. '	T
ł		, MIS	FUNCTION								,	•		-		٠					
	•		<u>-</u>		0/3			9/0	0/3	0/7	0/7	0/7	1/0	0/2	. !						T
			3	2/0	7/0	7/0	0/4	7/0	0/4-	0/4	0/4	9/0	7/0	5/0					T		T
		ORT	<		0/3	0/3	0/3	0/3	0/3				,						T		T
	İ	SUPPORT	>	8/0			,	0/5	·	5/0	9/0	5/0	5/0	0/5							T
í	,		FUNCTION	90	41					42				07.							
	12.		4	0/4	0/7	4/0	0/7	0/4	0/4	0/7	0/7	0/7	0/7	0/7			T		<b>†</b>	T	T
RVICE	RECEIVE HANDOFF	. '	ن	0 2	1		0/1	-	0/1	0/1	0/1	0/1	1/0	0/1				1			T
TARGET SERVICE	IVE II.	FLICHT	-3							-			-		<u> </u>			T	1	T	1
TARG	RECE	.ţe.	>	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0					1		T
PHASE	SEGMENT 22:	1	FUNCTION	25			,														
H	35		CUM.	10	20	30	07	50		-30		06	100	110	120	130		3 4	067	200	0/1

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	TARC	TARGET SERVICE	RV1CI		, ].													
	SECMENT 23:		TEAM COORDINATION	UINA	rton							MET	METHOD						. '
••••	· ·	ł	FLIGHT	-	,		SUP	SUPPORT	·.		X	MISSION		, ,			TOTAL	NL RENT	
CUM.	FUNCTION	>	V	U	a.	FUNCTION	>	A	J	- A	FUNCTION	>	4	ړې	d	۸.	Y	ာ	ď
10	29	2/0		3/3	0/7	33	2/2	2/2	2/2							4/2	2/2	5/5	7/0
200		5/5		3/3	0/7								-			5/5		3/3	0/7
9 0		5/5		3/3	0/7	90	5/0		2/0							10/5		5/3	0/7
07		5/5		3/3	0/7						46	5/0		0/3	0/4	5/10		3/6	4/4
· ·	,	5,5		3,3	0/7							5/0		0/3	0/4	5/10		3/6	4/4
2 9		5,5		3/3	0/7	50		0/3	7/0	0/3		5/0	,	0/3	7/0	5/10	0/3	3/10	4/7
2 6		5/5		3/3	0/7			0/3	0/4	0/3						5/5	0/3	3/7	4/3
80		5/5	•	3/3	7/0			0/3	7/0							5/5	0/3	3/7	0/7
90	18	9/0		0/5	0/7											9/0		0/5	4/0
100		9/0		9/0	0/5						-			'		9/0		9/0	5/0
110		2/2		1/0	0/7						,					2/2		1/0	0/7
120	54	2/0		1/0	7/7										-	2/0		1/0	7/7
130	Ŀ	2/0		0/2	7/7						32	0/1	,	0/3	0/4	2/1		0/5	8/7
140		2/0		0/2	7/7			,		,		0/4	,	0/4	7/0	2/4		9/0	8/7
150		2/0		0/2	7/7					·		0/4		0/3	0/4	2/4		0/5	4/8
160	,													,					
170																	-	,	
9 0				Γ															1
2																	,		

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	TAR	SET SI	ERVIC	E, AIF	TARGET SERVICE, AIR-TO-AIR			'					.				
	SEGMENT 24:		ACQUISITION	NOI								MET	METHOD	FREE	SEARCH			
	1		Et 10ur	_			Taoadiis	Lau		,	.   .	NOTSSIM	•	1		,	TOTAL	AI. RRENT
į													֓֟֝ <i>֡</i>					
SECS.	FUNCTION	۷	٧	င	۵	FUNCTION .	Λ	٧	ပ	a.	FUNCTION	>	4	ပ	۵	>	V.	٥
10	25	2/0		1/0	4/0	90	5/0		2/0							1/0		3/0
. 20	54	2/0		1/0	4/4			·								-2/0		1/0
30		2/0		0/2	4/4	33	2/2	2/2	-2/2							4/2	2/2	2/4
70	,	2/0		0/2	4/:						32	0/1		0/3	7/0	2/1		0/5
20		2/0		0/2	4/4							7/0		7/0	7/0	2/4		9/0
9		2/0		0/2	4/4						15	7/0		9/0	0/4	2/4		9/8
70		2/0		0/2	4/4					,		0/2		7/0		2/2	, ]	9/0
80		2/0		0/2	7/7	67	0/5	0/1	0/4	0/3	,				1	2/5	0/1	9/0
06		2/0		0/2	4/4		0/3		0/3	0/4	,	. ,		,		2/3		0/5
100	·	2/0		0/2	4/4		0/4		0/5	0/4						2/4		0/1
110		2/0		0/2	4/4		0/3		0/3	7/0	20	7/0		70	7/0	2/7		9/0
120	·	2/0		0/2	4/4		0/3	,	0/3	0/4		9/0		9/0	7/0	2/9		0
.130		2/0		6/2	4/4		0/3		0/3	0/4				2/0		2/3		0/1
140							,	,										
150																		
160														-				
170				,	,	•							,		-		,	
180																	,	
•																		

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMENBERS

	PHASE	TAR	GET S	ERV IC	E, AI	TARGET SERVICE, AIR-TO-AIR													
	SEGNENT 25:	1	AGEME	ENGAGEMENT, AIR-TO-	IR-TO	-AIR						MEJ	ТНОБ	FROM	METHOD FROM MASKED POSITION	D POSI	TION		
			FLIGHT	₽.		,	SUP	SUPPORT			×	NGISSIW	~		,		TOTAL	. TOTAL CONCURRENT	
CUM. SECS.	FUNCTION	Δ	٧	၁	a,	FUNCTION	>	۷ .	ပ	Ь	FUNCTION	Λ	4	ပ	Ь	۸	A	ပ	<u>a</u>
10	25	2/0		2/0	0/7	. 90	5/0		2/0							1/0		4/0	0/7
20		2/0		2/0	4/0		5/0		2/0							1/0		4/0	0/7
30	54	5/0		1/0	4/4			·								2/0		1/0	4/4
07		2/0		1/0	4/4	,					48	7/0		0/3	0/4	2/4		1/3	4/8
50	03	4/0		5/0	4/0							0/4		0/3	0/4	7/7		5/3	4/4
09		2/0		1/0	4/0		,					7/0		0/3	0/4	2/4		1/3	4/4
2 -33		2/0		1/0	4/0							9/0		9/0	0/4	2/6		1/6	4/4
80		2/0		1/0	4/0		,				_	9/0		9/0	0/4	2/6		1/6	4/4
06		2/0		1/0	4/0									7/0		2/0		1/7	4/0
100		2/0		1/0	0/7			1		,	-			2/0		2/0		1/7	4/0
110		2/0		1/0	4/0						36	0/5		0/3	0/1	2/5		1/3	4/1
120	53	2/0		2/0	7/0											2/0		2/0	4/0
130		4/0		2/0	4/0					١						0/4	,	2/0	-4/0
140		2/0	·	1/0	4/0											2/0		1/0	4/0
150	·	2/0		0/1	0/7		·			,						2/0		1/0	7/0
160		-2/0		1/0	0/7						23	0/5	0/1	9/0	7/0	2/5	0/1	1/6	4/4
170	12	2/0		5/0	4/0									1		2/0		5/0	7/0
180		2/0	_	0/9	4/0		_		_						,	2/0	-	0/9	4/0

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

1	1	GET SERVICE	ERVICI		3, AII	-TO-AIR									ON AND	191	NO.		
SECMENT 26: ENCACEMENT, AIR-TO-AIR	- 1	AGEMENT, AIR-TO-AIR	NT, AIR-TO-AIR	IR-TO-AIR	-AIR	1	-				,	Œ	ЕТНОГ	S S	SULUC	METHOD RUNNING FIRE, CANNON	NNCS		
FLICHT							SUPI	SUPPORT		•	•	MISSION	NO			,	TOTAL	TOTAL	
CUM. FUNCTION V A C P FUNCTION SECS.	A C	a O	۵۰	-	FUNCT 10	z	>	A	ပ	P	FUNCTION	>	<u> </u>	٥	<u>a</u>	>	V V	O	p.
58 4/0 3/0 4/0	3/0	-	-	0/7											<u> </u>	7/0	_	3/0	4/0
4/0 3/0 4/0	3/0			0/4						,			$\dashv$	-	1	4/5		3/3	1/1
28 2/0 - 2/0 4/0	2/0	2/0		0/7							-36	0/5		6	3 0/1	2/0		2/0	4/0
2/0 2/0 4/0	2/0	_	_	0/7			-			_		_	,		_	2/0		2/0	0/7
2/0 2/0 4/0	2/0												_	-	_	2/5		2/2	4/4
	2/0				,						22	0/5		0/2	2 0/4	2/5		2/2	4/4
	2/0			0/4								0/5		0/2	2 0/4	2/0		2/0	4/0
2/0	0/9			4/0										_		2/0		0/9	0/7
								·						,					
100	1										-	_	_	_	_				
110								·				_			_				
120				,	,	·	-												
130									,		-					,	,	,	
140												٠ ,							
150												·							
091									,										
170					,			1						_					
081												<del></del>		_					

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS-TWO CREWMEMBERS

	METHOD RUNNING FIRE, MISSILE	TOTAL GONCURRENT	P FUNCTION V A C P V A C P	4/0 3/0 4/0	36 0/5 0/3 0/1 4/5 3/3 4/1	4/0 2/0 4/0	4/0 - 5/0 4/0	23 0/5 0/1 0/6 0/4 4/5 0/1 5/6 4/4	2/0 5/0 4/0	2/0 5/0 4/0	7/0 4/0										
• ,	MISSIL	T		0	2	0		$\dashv$	0	0	0										
	FIRE,		Λ	4/	$\dashv$	77	/7	$\dashv$	7/	2/	7			,							-
	INING		a <sub>1</sub>				_			_	-	٠				'			_	_	L
	RUN	-	ں 		0/3		_							-						_	
	ETHOD	NO	V	_			_								<u> </u>			_	ļ.	_	L
,	Œ	MISSI	<u> </u>		0/5		_	0	_			,					_			_	
	,	1	FUNCTION		36			23					į								
			Q.					,			,										
			U								2/0		<u> </u>		_	_					
		SUPPORT	4														L			_	
		SUE	>			,		-			5/0						L				
TARGET SERVICE, AIR-TO-AIR	-AIR		FUNCTION							٠.	90										
E, AII	ENGAGEMENT, AIR-TO-AI		<u>a</u>	7/0	0/7	0/7	0/7	0/7	4/0	0/7	0/7					-		T			1
ERVICI	NT, A	F	U	3/0	3/0	5/0	5/0	5/0	5/0	5/0	5/0										
GET S	AGEME	FLIGHT	<b>A</b>																		
TAR	ł	1	>	0/7	4/0	0/5	4/0	0/7	2/0	2/0	2/0										
PHASE	SEGMENT 27:		FUNCTION	5.8	3	03			12									,			
, p.	, w		CUM.	SECS.	2 2	30	07	20		-35		8 8	2 2	20.	130	021	000	041	061	190	2

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS--TWO CREWMEMBERS

	PHASE	TARC	ET SI	ERVIC	TARGET SERVICE, AIR-TO-	AIR								• 1					
	SEGMENT 28: HANDOFF AERIAL THREAT	HANI	OFF /	AERIA	L THR	EAT -						MET	HOD 1	METHOD VOICE					
	. ·		FLIGHT	H	•	·	SUPI	SUPPORT		<b>1</b> .	<b>Σ</b>	MISSION		•			TOTAL	AL RRENT	
CUM.	FUNCTION	>	V	U	a,	FUNCTION	>	A	J	А	FUNCTION	>	A .	၁	Ь	Λ	A	O.	ь
10	25	2/0		2/0	0/7	- 90 -	5/0		2/0						•	1/0		4/0	4/0
20.	54	2/0		0/2	7/7				·							2/0		0/2	4/4
30		2/0	·	0/2	4/4	33	2/2	2/2	2/2					7	,	4/2	2/2	2/4	4/4
07		2/0		0/2	4/4						32	0/1		0/3	9/0	2/1		0/5	4/8
20		2/0		0/2	7/7							0/4		7/0	0/4	2/4		9/0	4/8
9		2/0		0/2	4/4						15	7/0		9/0	0/4-	2/4		8/0	4/8
02		2/0		0/2	4/4						,	0/2		0/4		2/0		9/0	4/4
08		2/0		0/2	4/4	67	0/5	0/1	0/3	0/1	27	6/0		0/3	0/4	2/3		0/5	4/9
06		2/0		0/2	7/7	50		0/3	9/0	0/3		7/0		0/5	0/4	2/4	0/3	9/0	4/7
100		2/0		0/2	7/7			0/3	0/4	0/3						2/0	0/3	9/0	4/7
110		2/0		0/2	7/7			0/3	7/0	0/3	•					2/0	0/3	9/0	4/7
120																			
130	ı										. ,		,						
071																			
2 5																			
160																			
170					<u>.</u>										,				
9 6			Γ										7				 !		
201																			

SUMMARY OF CONCURRENT AND SEQUENTIAL WORKLOAD DEMANDS -- TWO CREWMEMBERS

TARGET SERVICE, AIR-TO-AIR

	, .	ሲ	4/0	7/0	4/4	4/8	4/8	4/7	4/10	4/10	-4/7	4/8	4/8	4/8	4/4	4/4	4/11			
	AL RRENT	၁	4/0	2/0	3/2	0/5	9/0	9/0	9/0	9/0	9/0	0/5	0/4	0/8	9/0	9/0	0/11			
,	TOTAL	Ą			2/2			0/3	0/3	0/3						0/3	0/1			
·		Λ	2/0	2/0	4/2	2/1	2/4	2/0	2/5	2/5	2/0	2/3	. 2/5	2/4	2/2	2/2	2/9			
ы	٠	A,				0/4						0/4	0/4	0/4			0/4			
VOIC	-	ပ				0/3	1					0/3	0/2	9/0	0/4	0/4	0/5			,
METHOD VOICE	Z	¥														0/3				
ME	MISSION	>				0/1						0/3	0/5	0/4	0/2	0/2	0/4			
	. <b>24</b>	FUNCTION				32			,			95		15			27			
	•	Ь			,				9/0	9/0	0/3						0/3			
		υ	2/0		2/2			0/3	0/4	0/4	0/4						0/4			
	SUPPORT	₹			2/2			0/4	0/3	0/3	0/3						0/1			
	SUF	>	5/0		2/2			0/3	0/5	0/5							0/5			
		FUNCTION	90	, ,	33			41							,		64	,		
न	,	а	0/4	4/0	7/7	7/7	4/4	7/7	4/4	7/7	4/4	4/4	4/4	4/4	4/4	4/4	4/4			_
HANDO	Ę	υ	2/0	2/0	1/0	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2			
EIVE	FLIGHT	¥.					,													
REC	-	>	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0	2/0			
SEGMENT 29: RECEIVE HANDOFF		FUNCTION	25		54														,	
٠.	ı	CUM. SECS.	10	20	30	07	20	09	70	80	06	100	110	120	130	140	150	160	170	180

## END

DATE: 4-91

DTIC